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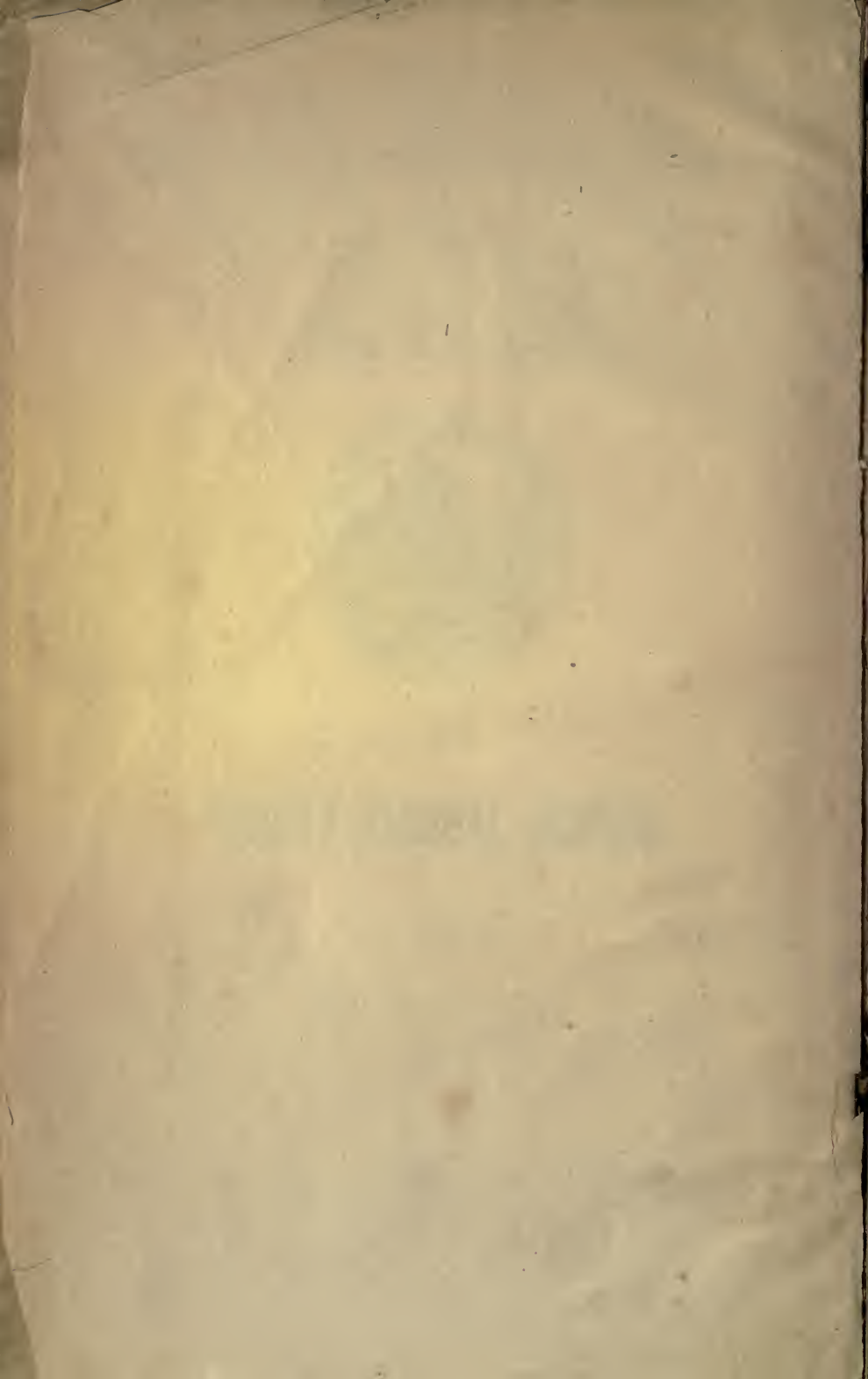
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LECTURES
ON
THE MORBID ANATOMY
OF THE
SEROUS AND MUCOUS MEMBRANES.

IN TWO VOLUMES.

BY

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MEMBER OF THE LYNCEAN ACADEMY OF ROME, THE GEOENIAN SOCIETY OF
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MEMBER OF THE ROYAL MEDICAL SOCIETY OF EDINBURGH,
AND OF THE MEDICAL SOCIETY OF GHENT,
&c. &c.

VOL. I.

ON THE SEROUS MEMBRANES; .

AND, AS APPENDED SUBJECTS,

PARASITICAL ANIMALS, MALIGNANT ADVENTITIOUS STRUCTURES,
AND THE INDICATIONS AFFORDED BY COLOUR.

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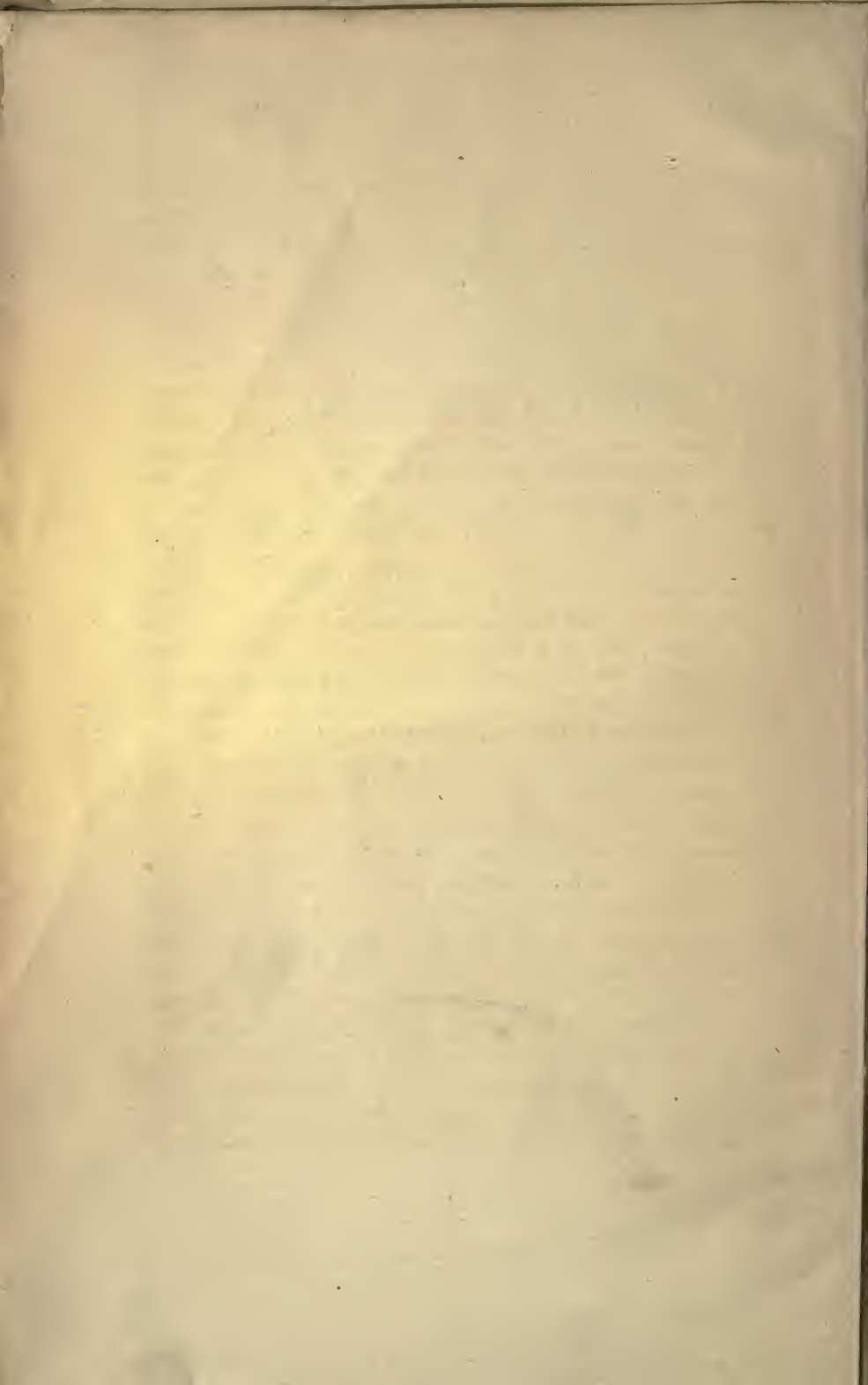
Crown Court, Temple Bar.

TO
WILLIAM STROUD, M.D.

IN TOKEN OF SINCERE REGARD,
THE RESULT OF LONG AND PROVED FRIENDSHIP;
AND AS A MARK OF UNFEIGNED RESPECT
FOR HIS ACQUIREMENTS,
AS A LEARNED, EXPERIENCED, AND ABLE PHYSICIAN,
AS WELL AS FOR HIS EXEMPLARY VIRTUES
AS A MAN AND A CHRISTIAN;

THIS VOLUME
IS INSCRIBED BY

THE AUTHOR.



PREFACE.

IT may be thought that a new work on Morbid Anatomy, especially if it do not comprise the whole field of this extensive subject, is a superfluous addition to the numerous productions of the Medical Press. It may be said, that the writings of Baillie, of Bright, of Carswell, and of Craigie, in this country; with those of Andral and of Louis, which are extensively known, both in their original form and in translation; and the splendid fasciculi of Professor Cruveilhier, in addition to his publication of the valuable Lectures of Dupuytren; constitute an ample fund of pathological writings. It may be objected, that, in addition to these, the systems and monographs which have appeared in France, Germany, and Italy, and which are more or less known, either in their original form or as the bases of articles in Reviews and Encyclopædias, already comprise a larger amount of literature on this subject than medical men, whether students or practitioners, find it convenient either to purchase or to peruse. I admit the objection—having felt its weight: yet other reasons have operated, with counteracting force, to induce me to lay the following pages before the public. At the time when I commenced the study of the medical profession, a strong bias in favour of the pursuits of Pathological Anatomy not only influenced my course of study in London and Edinburgh, but prepared me to receive, with peculiar interest, the instructions and demonstrations of Laennec, at the Hôpital Necker, and of Rostan, at the Salpêtrière; as

well as to witness the numerous inspections at the Hôpital de la Charité, which were at that time principally performed by Professor Andral, then a student, and laboriously engaged in collecting the mass of valuable facts which he has since published in his *Clinique Médicale*. These advantages, with others of less moment, subsequently enjoyed in Italy and elsewhere, may be mentioned as circumstances which led me to undertake, with peculiar interest, the office of inspector of the dead at Guy's Hospital; together with the charge of the Museum, which, though small and limited at that period, had recently received a powerful stimulus to its increase in the separation which had just been concluded between the Borough Schools.

The making of several hundred inspections necessarily brought under my notice a great variety of appearances in most of the organs of the body. The results of them all being, with few exceptions, recorded with more or less minuteness, and the specimens being in many instances either preserved or faithfully delineated, greatly facilitated the comparison of morbid appearances with each other. The simultaneous formation of the Museum not only called for and facilitated this comparison, and compelled me to turn my attention to a systematic classification, but also brought under my notice rare and interesting specimens, presented to our Museum by those whose liberality prompted them to add to our collection. I had, at one time, contemplated drawing some statistical conclusions from these accumulated details: but, in addition to other insuperable difficulties, the fact, that the cases examined and recorded formed but a very small proportion of the patients admitted into the hospital, precluded the possibility of arriving with any degree of accuracy at the conclusions which I was desirous of obtaining. I was not at that time acquainted with the mode in which Louis was conducting

his labours; which have not only surpassed any thing which I had contemplated, but must cause him to be held in lasting remembrance, as one of the most laborious cultivators of the medical profession: whilst, in establishing the numerical method, so admirably calculated both to elicit truth and discard error, he has placed himself amongst its greatest benefactors. Although the first and main incentives to post-mortem inspection, namely, the elucidation of symptoms and the confirmation or correction of diagnosis, have always been kept in view, it has also been a prominent object, as an important part of inquiry especially connected with the interests of the Museum, to investigate morbid appearances in relation to each other, and with reference to the commencement, progress, and ultimate results of particular modes of derangement. Such a course could only be taken by the help of General Anatomy, in seeking to become acquainted with the changes of particular structures, and in analysing the derangements of those organs which possess a compound structure. In this country, Morbid Anatomy had not been made the subject of a regular Course of Lectures; but had been taught incidentally, in the Lectures on Special Anatomy, Surgery, and Medicine. In the Session of 1827, I began to lecture on this subject; and, for the reasons stated in the Introductory Lecture, I selected the Serous Membranes. The following year, I was engaged with the Serous Membranes, Parasitical Animals, the diseases called Malignant, and the Mucous Membranes. Although, in different seasons, some other subjects have also been taken up; such as, the Cellular Membrane, Bone, and the Heart and Vascular Systems, I have invariably found that the important objects first enumerated have unavoidably occupied the best part of the course. I have therefore felt disposed to yield to the suggestion of some of my friends, who have been led,

by their kind and favourable opinion, to recommend the publication of the Lectures. By this means, I shall, at least, be enabled to present to the Students of the School of Guy's Hospital those views with which it is essential that they should be made acquainted, in order to comprehend the Lectures which, in continuation of the subject, I hope to deliver on other tissues and organs. From the number and variety of my engagements, I should scarcely, however, have been able to accomplish, and probably should not have undertaken, the publication of this series of Lectures, had it not been for the kind and valuable assistance of my excellent and accomplished friend, John Blackburn; who took upon himself the arduous task, both of revising the manuscript, which was in the hand-writing of different amanuenses, and also of directing and correcting the press. Amongst other advantages, for which the reader is indebted to him, must be mentioned the marginal indices, which cannot fail greatly to facilitate reference to the subjects treated of.

At the close of the Volume will be found a few Cases, selected by way of illustration of some of the subjects mentioned in the Lectures. I have likewise referred to a few of the Preparations in the Museum; and to some of the Plates which have been published by Sir Astley Cooper, Dr. Bright, Dr. Carswell, and Professor Cruveilhier. I trust that these learned authors will regard this procedure as an act rather of respect than of plagiarism; and that the reader will find himself indemnified by it, for the omission of Plates which would have seriously increased the expense of the work, and thus frustrated one of my objects in publishing it. It is also desirable that the reader should refer to the Catalogue of the Museum of Guy's Hospital; which may be regarded as bearing the same relation to a system of Morbid Anatomy that the

Flora of a district does to a system of Botany. Although it is not to be understood that the collection contains specimens of every known morbid alteration of texture, nevertheless there are, comparatively, few which it does not exemplify: and, as these specimens are arranged on the same principles as have been adopted in the Lectures, an acquaintance with the Catalogue, especially if conjoined with the examination of the specimens in the Museum, will afford a tolerably good idea of the mode in which the principles are applied to the classification of other textures and organs. In the course of my Lectures and Demonstrations, appearances have been noticed, and some opinions have been offered, which I believe to have been undescribed and new: some of these have been since published by others. Such occurrences can scarcely fail to take place, in the progress of the investigation of truth: and I feel somewhat indemnified for an apparent loss of originality, in the confirmation of the exactness of my observations.

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CORRIGENDA.

Page 88, l. 17, for *granulated* read *annulated*.

- 143, in the second marginal reference, for *Poltore* read *Poulton*.
- 147, l. 7, from the bottom, and in the margin, for *secretions* read *accretions*.
- 201, the part of the second paragraph commencing with, "They have marginal pores," and ending with "eucurbitini," is out of place; and belongs to p. 198, where it should conclude the first paragraph on *Tænia solium*.
- 212, l. 19, for *contractor* read *constrictor*.
- 213, l. 8, from the bottom, for *classed* read *has classed*.
- 219, l. 5, from the bottom, for *demands* read *demand*.

LECTURES ON PATHOLOGICAL ANATOMY.

LECTURE I.

IMPORTANCE OF MORBID ANATOMY—THE STUDY OF IT NECESSARY TO THE CONSCIENTIOUS AND SKILFUL PRACTITIONER — OBSERVATION OF SYMPTOMS AND STUDY OF SPECIAL ANATOMY NOT SUFFICIENT TO CONSTITUTE A PATHOLOGIST.—ASSISTANCE RENDERED BY MORBID ANATOMY TO PHYSIOLOGY—RISE AND PROGRESS OF MORBID ANATOMY—ITS CULTIVATION AMONG THE GREEKS AND ROMANS — REVIVAL OF MEDICAL SCIENCE IN THE ITALIAN STATES—LABOURS OF BARTHOLIN, BONETUS, MORGAGNI, LIEUTAUD, LUDWIG, SANDIFORT, BAILLIE, PORTAL, VOIGTEL, CORVISART AND HIS DISCIPLES. —RECENT RAPID ADVANCE OF THE SCIENCE, AND ITS CAUSES: 1. THE STUDY OF GENERAL ANATOMY. 2. THE BROUSSAIEN CONTROVERSY — RESEARCHES OF LOUIS, AND OUTLINE OF THE NUMERICAL METHOD. — PLAN OF THE PRESENT COURSE — GENERAL ANATOMY THE BEST BASIS — DIVISION OF THE BODY INTO TISSUES, RATHER THAN INTO REGIONS—SELECTION OF SEROUS AND MUCOUS MEMBRANES.—ARRANGEMENT OF TOPICS—ABNORMAL STATES CONSISTING IN DEFICIENCY—IN EXCESS—IN FORM—IN THE RESULTS OF INFLAMMATION—IN THE RESULTS OF SCROFULA—IN MALIGNANT DISEASE — IN THE PRESENCE OF HYDATIDS—IN THE EFFECTS OF ACCIDENTAL INJURY.—INDICATION OF THE BEST WRITTEN SOURCES OF INFORMATION—CONCLUSION.

GENTLEMEN,

IT may be thought surprising, that, in delivering a Lecture introductory to the subject of Pathological Anatomy, I should feel the necessity of urging the pursuit of an object which not only presents so many points of self-evident importance to excite your zealous attention, but is increasingly recommended to you, both by precept, in the Regulations of the Apothecary's Company, of which some of you are ambitious to become members, and, still more forcibly, by the bright example of those who, in this and in

other countries, have raised themselves to well-merited distinction by the successful cultivation of medical science.

Importance
of Morbid
Anatomy.

To those who may place the *summum bonum* of medical practice in converting the largest quantity of physic into gold, morbid anatomy must, I am aware, be an object of disgust, rather than of attraction; but those who are aspiring to become the worthy members of a profession which has for its object the restoration of health to our suffering fellow-creatures, and of which it has been said, in the words of Cicero, “*Homines ad deos nullâ re propiùs accedunt, quàm salutem hominibus dando,*” must see, that morbid anatomy, or the investigation of those physical derangements which, as the consequences of disease or accident, it is their business to avert or remove, constitutes a study the most essential to their art. Sydenham has, not without justice, been reproached with vanity, for declaring that there was no disease, which, if completely made known to him, the resources of his art would not enable him to cure: but, whilst I could almost sanction this preposterous confidence, as a powerful stimulus to the complete investigation of morbid changes, I can see no palliative for the presumption of those who profess to administer the remedy, even without the knowledge of the disease. Amongst such a class, however, must those be placed, who are regardless of morbid anatomy.

It would be a gross mistake to suppose that the most extensive acquaintance with nosological terms, combined with all the knowledge that written or oral instruction is able to convey, is sufficient to give that acquaintance with disease, which can duly qualify for the application of curative means, or that it will carry us forward towards that ideal perfection described in the declaration of Sydenham. I cannot but admire the remark of Hogarth, when he says, that those “students who confine their studies to the works of the “dead, need never hope to live themselves.” The spirit of it is as applicable to our art, as to his. We can only

become properly initiated into our profession by personal acquaintance with disease, founded on our own patient investigation at the bed-side of the sick, and by a diligent examination of the effects of disease, as brought to light by cadaveric inspection. The practice of examining the dead, for the purpose of ascertaining the seat and effect of disease, is absolutely necessary to complete those ideas which it is impossible for the best verbal descriptions perfectly to convey: and it is also necessary, as the means of detecting that which yet remains to be either wholly discovered or more fully elucidated.

Although it may be highly attractive to have in view the prospect of adding to the general stock of knowledge in our profession, and on this account may be more particularly desirable to inspect the bodies of those who have died under rare and singular affections, it is no less important, both for students and those actually engaged in practice, to seek every opportunity of making or witnessing *post-mortem* inspections, even in those cases which may be regarded as of ordinary occurrence. It is only by this practice that the student can learn to distinguish the almost endless varieties of aspect which parts and organs assume; and to avoid confounding three things, essentially distinct—healthy, diseased, and cadaveric appearances: and to him who is engaged in practice, it is no less necessary, in order to keep up his knowledge, and to rectify, confirm, and improve his diagnosis. I do not hesitate to assert, that it is as necessary for the medical practitioner to appeal to this only certain test, as it is for the merchant to keep and balance his accounts. I do not deny, that many, who have neglected this practice, have exercised their profession successfully, not only as respects the improvement of their own fortunes, but also the relief of their patients; yet I cannot help regarding such success, as resembling that of a fortunate gamester, rather than of a steady and sure merchant. It is true that we cannot be called to account by the

All Cases
ought to be
examined.

patients who die under our hands, as those who are engaged in commerce may be summoned to make a statement of their affairs; yet conscience, and that interest in his profession, and for his patients, which every medical man ought to feel, should stand in the place of incessantly importunate creditors.

Knowledge
of Morbid
Anatomy
sometimes
publicly
tested.

There are, moreover, occasions on which medical men, in spite of indifference on the points which I have mentioned, are unavoidably called upon to give public proof of that knowledge which is only to be obtained by the enlightened examination of the dead. It is from the very great and general neglect of the important study of pathological anatomy that so large a portion of the accounts of inspections, whether made for judicial purposes or to gratify curiosity in rare and remarkable cases, are so extremely imperfect, that nearly all we can say of them is, that one is more vague than another.

Good spe-
cial Anato-
mists not
necessarily
Patholo-
gists.

It may be thought incredible, but I am persuaded of the fact, that this remark is applicable to many inspections performed by those who are justly entitled to be considered good anatomists. This is the natural consequence of what appears to be the prevailing opinion amongst students, in this city at least; viz. that the perfection of anatomical knowledge consists in a minute acquaintance with special or descriptive anatomy, to the almost total neglect of general anatomy, or that division of the subject which teaches the peculiarities of structure in the healthy state, and which is consequently most intimately connected with pathological anatomy. The special anatomist may give us a minute account of the wound of an arterial ramification, or an accurate description of a partial dislocation: he may describe the exact direction which the fracture of a bone has taken between its foramina and processes, the muscles which the fractured extremities have lacerated, the ligaments torn through, and the nerves divided or pressed upon. In all this, there may be much display of anatomical knowledge—

and, I would also say, much useful and important information, in reference to those cases in which surgical assistance can avail; but I repeat, that the most accurate special anatomical knowledge is, singly, inadequate to throw light on very many of the effects of disease.

Besides the more obvious importance which morbid anatomy possesses, as one of the most essential elements of sound pathology, and as the indispensable guide to, and test of diagnosis, it derives a great degree of importance and interest from the light which it may throw upon the nature and progress of those processes which are continually going on in living organized bodies, and which present an almost endless variety, dependent on the structure or tissue of the parts in which they take place, on the age of the individual in whose body they are performed, and on the varieties of disease by which he may be generally or locally affected. In these processes, and the changes to which they give rise, the ultimate elementary molecules of which the animal structures are composed, are principally concerned: they have therefore been sometimes called 'molecular changes.' From their very nature, they are necessarily of difficult investigation; since they must often have made considerable progress before they become strikingly evident to our senses. These processes have been generally comprehended under the term 'actions'; and when the effect has become manifest in any organ or tissue, it is said, that the action of the part is altered — that a new action has been set up. Now, I particularly wish to caution you against receiving this as an explanation: it is, in fact, only a substitution of terms; something like saying that the striking of the clock is the result of a sonoric power. Sometimes, it is true, a hypothetical explanation is attempted, by modifying the preceding expressions, and saying, the action *of the vessels* of the part is altered. We are, however, so much in the dark as to the *modus operandi* of the minute capillaries, both in health and disease, that if

Assistance
of Morbid
Anatomy in
the study of
Physiology.

we attach any definite idea to the expression, '*altered action of the capillaries of a part,*' we must be indebted for it to imagination, rather than to demonstration. Though I am very far from having the arrogance to suppose that I shall be able to explain these mysterious processes, yet I wish to call your attention to them, in a point of view in which some of you may not have hitherto contemplated them. They are, in fact, the operations of living animal chemistry; and are, consequently, processes which we can neither imitate by art, nor, by the most careful observation, closely watch, and follow, during their progress. We may, indeed, when examining some of the lowest forms of animal life, by the help of very powerful microscopes, percèive the processes of deposition and absorption going forward; the one forming, the other removing, the most delicate organs: and I assure you that I can scarcely conceive a more intensely interesting spectacle than that which my friend Joseph Jackson Lister exhibited to me, when he placed a living zoophyte in the field of his admirable microscope. This highly interesting exhibition, which will probably lead to curious and important physiological discoveries, will not, at present at least, afford us much assistance in the investigation of those processes to which I have been alluding. It is to morbid anatomy that we must look for our chief assistance in this investigation. The changes which disease effects in our different structures and organs, may be regarded as experiments in animal chemistry, performed for us by nature herself; and, although we cannot watch these experiments in their continued progress, the death of the individuals, or the removal of the affected parts, may enable us to view their progress in all its stages, and to connect them together as a whole. With this view, morbid appearances, which may be regarded as trivial, either in themselves, or from their being situated in parts of little moment, as respects treatment, sometimes acquire a new and important interest. I beg of you to bear this in mind, when I may

hereafter lay before you, as connecting links, morbid appearances which you may regard as, otherwise, undeserving attention.

You must not, however, suppose that I wish unduly to raise the importance of pathological anatomy; although to *it*—and to *it* alone—we are indebted for much that has been rescued from the domain of conjecture in our profession. It must be confessed, that there are many points, which morbid anatomy never has explained, and probably never can explain. Still it affords some assistance towards our better acquaintance with these, by enabling us to detach the class to which it is applicable, from that which calls for other modes of investigation.

Morbid Anatomy does not elucidate all diseases.

I am very far from urging the commencing student to devote that time to the study of morbid anatomy, which he ought to spend in the acquirement of many branches, which, as preliminaries, are of greater importance; but I wish to impress on your minds, that *that* medical education must be miserably defective, which is terminated without this essential branch having been cultivated. I do not doubt, but that those who have been much longer acquainted with our profession than myself, will fully confirm the uniform result of my own observation, that the most assiduous and successful pupils, as well as the most zealous and enlightened practitioners, have ever been distinguished by the pains which they have taken to increase their familiarity with morbid anatomy.

Morbid Anatomy not suitable for the commencing Student.

Although the Fathers of Medicine have left but little on record respecting morbid anatomy, it is not possible that so interesting and attractive a subject could have been lost sight of, or neglected, by them. Amongst the ancient Egyptians, those who, whether as priests or physicians, had to perform the office of embalming the dead, must have had innumerable opportunities of becoming acquainted with morbid anatomy. From the Egyptians it is highly probable that Hippocrates derived many ideas, not only

Egyptians, Greeks, and Romans.

respecting our internal structure, but also respecting the alterations produced by disease; for, although he has not given us the detail of inspections, it is evident, from many of the terms which he has employed, that he was not wholly unacquainted with the morbid affections of internal parts. When, at a later period, living individuals were given up for the purposes of anatomical and physiological research, it can hardly be supposed that the bodies of those already dead from natural causes were not often devoted to the same purpose; thereby affording to the examiners the means of observing the causes from which disease and death had proceeded. We know, indeed, on the authority of Celsus, that this was actually the case; and whilst he justly reprobates the barbarous acts to which I have alluded, and points out their inexpediency, he at the same time advocates the advantage of the inspection of the dead.

I shall not further take up your time with the inquiry into the state of *morbid* anatomy amongst the Greeks and Romans: nor do I think it necessary to hunt for the feeble traces of its dormant existence amongst those Saracenic hordes, who, during the middle ages, spread themselves over the south of Europe, bearing on their standards, in the figure of a waning moon, the emblem of their dim light, compared with the brightness of the day which was preparing to dawn.

Dawn of
modern Me-
dical Science
in Italy.

The revival of letters commenced in Italy. With the other sciences, medicine was introduced by the fugitives from Constantinople, amongst the descendants of those who had formerly received it from Asclepiades and Themison. In the flourishing Republics of Italy, and also in the States of the Church, there quickly arose numerous and indefatigable anatomists, who enriched their science by important discoveries, and, by the fame of their lectures, attracted from various parts of Europe those who were the most ardent in the pursuit of knowledge. Such were Eustachius, Fallopius, Fabricius of Aquapendente, Assillius, Vesalius, and

Veslingius. By the labours of these men, and of others who followed their example, in the different countries of Europe, many valuable contributions were made to pathological as well as descriptive anatomy.

It does not however appear that any distinct treatise had been written on the subject of *morbid anatomy* until the year 1674, when Thomas Bartholin, a Dane, published a work, entitled *Consilium de Anatomia Practica, ex Cadaveribus Morbosis adornanda*. This was quickly followed by the celebrated *Sepulchretum, sive Anatomia Practica*, of Theophilus Bonetus, a physician of Geneva; respecting whom it has been said, “egregie, si quis alius, meritus est.” He has given us, in an anatomical order, the result of his own careful observations, during forty years; together with a laborious collection from the works of his predecessors and contemporaries. From this time, the writings of most practical medical authors, whether physicians or surgeons, are enriched by cases, in which the detail and description of morbid appearances form some of the most interesting features.

Pathological Works
of Bartholin,

Bonetus,

I have next to mention one of the most illustrious individuals on the list of morbid anatomists, J. B. Morgagni, whose work *De Causis et Sedibus Morborum, per AnATOMEN investigatis*, justly styled, by Dr. Baillie, “stupendous,” is indeed one of the most remarkable and valuable monuments of our art. His cases are well chosen, and exposed with order and clearness: and his work, the first that can be regarded as any thing like a complete treatise on *pathological anatomy*, is an almost inexhaustible store of valuable facts; to which most succeeding writers on this subject have constantly had recourse, and which justly entitles him to be regarded as, in some sort, the Father of morbid anatomy. By his example, not less than by his lectures and writings, he has stimulated and directed the zealous researches of those who have endeavoured to extend the only firm and legitimate basis of true pathology, by discovering the seat

Morgagni,

of disease, and the nature of its action, as evinced by the changes which it has effected in the organization of parts. This great man seems also to have been destined by nature to furnish the best refutation of the arguments of those who neglect the opportunities of cadaveric inspection on the plea, that life and health are endangered by the diligent prosecution of these researches. He was one of the most striking exceptions to that received opinion, as to the shortness of the life of medical men, which has given occasion to the observation, "*Aliis inserviando consumuntur, aliis medendo moriuntur.*" In the enjoyment of corporeal vigour, and retaining unabated the energies of his mental powers, *Morgagni* continued, to his 90th year, not only to enrich the world by his labours as an author, but to deliver lectures to the undiminished interest of his audience.

Lieutaud,

I must not pass over in silence the merits of Lieutaud, who, though disparaged by Cullen, was no mean contributor to the progress of pathology. In his "*Historia Anatomico-Medica, sistens numerosissima cadaverum humanorum extispicia, quibus in apricum venit genuina morborum sedes, horumque reserantur causæ, vel patent effectus,*" although he has borrowed considerably from Bonetus and Morgagni, he has also added numerous facts, and many observations, from his own experience. His work has this great merit, that his descriptions of morbid appearances are always accompanied by an account of the previous symptoms. That very minuteness, with respect both to the symptoms and *post-mortem* appearances, which has drawn down upon its author the censure of Dr. Cullen, attaches to the *Historia Anatomico-Medica* of Lieutaud, as a work of reference, an intrinsic value, which neither the lapse of time nor the changing fashions of medical doctrine can destroy. Having said this, I have said all that I shall attempt to say in favour of Lieutaud; who, when his merits had raised him to be the first physician to the Court of France, still devoted his time to the advancement of his

profession. I shall leave his arrangement, his pathological opinions, and his prescriptions, to the censure of his illustrious Edinburgh reviewer.

That minute anatomist Ludwig, better known by his Ludwig,
elaborate work on the nerves, published his *First Lines of*
Pathological Anatomy, accompanied with copious references,
in 1783. About the same period, Professor Sandifort, who Sandifort,
enjoyed, at Leyden, the benefit of having the united Mu-
seums of Raaus and Albinus to refer to, gave to the world
his "*Observationes Anatomico-pathologicæ*," and his splendid
"*Museum Anatomicum*."

In this country, a treatise on pathological anatomy seemed Baillie,
to have been long a desideratum, when the opprobrium of
this deficiency was removed by the appearance of a work,
which, whether we regard the high estimation which it soon
commanded both at home and abroad, or the honour and
success which it obtained for its author, is perhaps second
to none which the medical literature of modern times has
produced. The *Morbid Anatomy* of Dr. Baillie—for years
confessed, even by our rivals, to be the most complete trea-
tise of the kind which had ever appeared—soon received the
homage of translation, in France, Germany, and Italy. It
contains, in a condensed form, a view of all the morbid
appearances which had been observed up to the time of its
publication, with short notices of the symptoms dependent
on most of them. The works of Portal in France, and of Portal, and
Voigtel in Germany, though published some years later Voigtel.
than the *Morbid Anatomy* of Dr. Baillie, and though con-
siderably more minute, have not obtained an equal degree
of reputation. Far be it from me to detract from the merit
of our justly celebrated countryman, or to underrate the
valuable contribution, which, in the publication of his great
work, he has made to medical science; but, whilst I am
ready to subscribe to the remark of Rothe, that no physician
ought to be without this book, and, from my own experience,
do not hesitate to state, that, even now, we are acquainted

with, comparatively, few morbid appearances which have not been seen and described by Dr. Baillie, I cannot help observing, that in his description of these appearances we may look in vain for that minuteness of detail which is essential to a work destined to teach pathological anatomy. This defect is rather to be ascribed to the condensed form which the author has adopted, and to the comparatively little attention which previously to his time had been paid to *General Anatomy*, than to any deficiency in his abilities or opportunities.

Recent rapid progress of Morbid Anatomy. Causes thereof.

Cultivation of General Anatomy.

There is perhaps no branch of medical knowledge, in which greater advances have been made, in the few last years, than in that of morbid anatomy. Two causes have mainly operated in the production of this favourable change. The first of these was the special cultivation of *General Anatomy*, the outlines of which were faintly sketched by Dr. Carmichael Smith. The higher praise, however, is due to the great Bichat; who, while he seems to have possessed the merit of originality equally with Dr. Smith, has pursued the subject into its minutest details; so as to leave little to his successors, but the introduction of a few slight modifications and divisions.

Disciples of Corvisart.

This indirect, but very important, service to the cause of pathological anatomy was not the only one which it received from Bichat. One of his last labours was the delivery of a course of lectures on *Morbid Anatomy*, of which he made his *General Anatomy* the basis. On the same basis, Pinel laid the outlines of his *Nosographie Philosophique*; and the numerous individuals of superior talent, who were fortunately brought together in the Clinical School of Corvisart—amongst whom, Bayle, Laennec, and Rostan must be specially noticed—following up the same plan, have made most important advances in this department. I shall not attempt to particularize their merits; since I shall, in the course of these Lectures, often have occasion to speak of their labours.

The second cause, to which I ascribe the remarkable advance recently made by pathological anatomy, is the formation of a new medical sect, which has arrogantly assumed to itself the peculiar title of Physiological; and, whilst it has too exclusively sought to localize every disease to which we are liable, and to refer to one common cause every deviation from the healthy structure, has boasted the possession of the first and only medical doctrine which has been raised on the sure basis of anatomy. Broussais, the author of the *Phlegmasies Chroniques*, the unquestionably talented, but enthusiastic and conceited founder of this sect, has long drawn around him, and attached to his doctrine, many of the most zealous and intelligent pupils of the French Medical School. These individuals, and also the opponents of the sect and its author, have sought their proofs and refutations in the inspection of the bodies of the dead. *Morbid anatomy* has hence been pursued with a zeal and minuteness altogether unprecedented. The labourers have been repaid by a vast collection of valuable, interesting and important facts; and very many excellent monographs have been produced, in illustration of the pathology of almost every tissue and organ.

The Broussaisien Controversy.

I cannot conclude this brief historical sketch without paying a tribute of respect to one of the most diligent labourers for the advancement of medical science that modern times have produced. When I call your attention to the name of Louis, I do so for the double purpose of setting before you the laudable example of a physician who has signalized himself by the zeal and indefatigable perseverance with which he has pursued his well-directed inquiries, and of describing to you his peculiar method of investigation, which is regarded by some as marking an era in the science of pathology, similar to that which the invention of Fluxions has created in Mathematics.

Louis, and the Numerical Method.

Professor Louis had already gone through the regular course of medical study, and had been for some time

engaged in the actual practice of his profession, when doubts respecting many generally-received medical opinions, and dissatisfaction with the mode of reasoning by which these opinions had been formed, induced him to lay aside practice, and to devote his whole time, and all his faculties, in the full vigour of the prime of life, to the most minute personal examination of disease, as it presents itself to actual observation. With this view, he confined his attention to one or more large wards in a general hospital in Paris. He made a minute and daily record of *all* the Cases there collected; taking care to find out, and to note, every particular connected with the previous history of the patient, which could in any way affect or complicate the existing malady. When the cases terminated fatally, he was equally particular in recording all the appearances observed in the inspection of the body; not confining himself to those appearances which might be supposed to be connected with the last illness, nor even leaving the integrity of an organ to be inferred from its being passed over in silence, but taking care expressly to record the fact. These histories he afterwards subjected to a minute tabular analysis, bringing together all those cases which belonged to a particular form of disease; and the tables, thus formed, he submitted to a still more minute tabular analysis. By this purely statistical method, it is obvious, that he precluded the possibility of being led astray by preconceived hypotheses; and that he avoided the danger of overlooking those coincidences which, under an ordinary review, might have escaped notice, from the attention being drawn to phænomena of more striking character, but far less general, or even accidental.

Some idea of the scrupulous anxiety which actuated Louis, in drawing his conclusions from these tables, may be formed from the fact, that he rejected all those cases which he recorded during the first six or eight months after he commenced this course of investigation, considering that his powers of observation and description were not suffi-

ciently cultivated to furnish the elements of that severe and rigorous deduction which it was his object to make. You will easily perceive, that the method of Louis affords the most salutary check to those ardent and enthusiastic geniuses whose fertile imaginations readily produce beautiful and captivating theories; which, when adorned by brilliant language and vivid illustrations, have been ever apt to acquire an extensive but temporary influence over medical science, the legitimate progress of which they have most seriously impeded. I will not pretend that the method of Louis is altogether new and original: the mode of analysis which he adopts, is clearly exhibited and recommended in the "Organon Medicum" of my friend Dr. Todd. Statistical medical tables have indeed long been constructed; but, in respect of accuracy, minuteness, and comprehensive purpose, they will not bear to be named, in comparison with those of Louis.

Trusting that you are convinced of the importance of the subject which is to occupy your attention, and are willing to follow the example of those eminent men whose labours I have briefly sketched, I shall proceed to point out the plan of the Course of Lectures which I propose to deliver.

Plan of the
present
Course.

I have hitherto considered, and I now see no reason to change my opinion, that the best arrangement for a course of morbid anatomy is that which is founded on general anatomy. It is only by collecting into one view the various alterations which disease effects in any particular tissue, that we can hope to arrive at an accurate knowledge of the relation which these modifications bear to each other, and to the healthy state. We may compare these with the modifications belonging to other tissues; and not only draw important conclusions in reference to practice, but hope, sooner or later, to obtain some little insight into the nature of some of the most important healthy as well as diseased actions. Instead, therefore, of dividing the body into regions, and enumerating the changes which may take place

Arrange-
ment found-
ed on Gene-
ral Anatomy.

Selection of
Serous and
Mucous
Tissues.

in the organs situated within fixed boundaries, I shall bring under your notice the morbid alterations of certain pervading tissues; which present the same characteristics throughout the entire organism, although they enter into relations with organs widely distinct in function and locality. It would be, however, vain to hope that the diseases of every tissue could receive sufficient consideration within the limits of a single course; and I have therefore selected, for our present investigation, the morbid alterations of the serous and mucous membranes. I have been induced to select these tissues, by the great frequency of disease in them, by their very general distribution throughout the economy, and by the comparative facility of perceiving and comprehending the changes which they have undergone. In pursuing the subject, I do not know that any better arrangement of topics can be made than that which I have adopted, in classifying the pathological preparations contained in our Museum. The deviations from the normal state, which organs may exhibit, are there arranged in the following way.

DEVIATIONS FROM THE NORMAL STATE; CONSISTING,

Abnormal
States.

1. In deficiency.
 - a* The result of suspended developement.
 - b* Loss sustained.
2. In excess.
3. In form.
4. In appearances which may be regarded as the result of ordinary inflammation.
5. In appearances which are the result of scrofula.
6. In appearances which are the result of diseases called malignant, or resembling them in structure.
7. In hydatids in the particular organ.
8. In the effects of accidental injury.

Deficiency.

The first subdivision depends on the deviation from the normal state, consisting in want or deficiency; and, as this

deficiency may arise in two ways, it has been necessary further to subdivide; and to make a distinction between those cases in which the deficiency is an original state, and those in which, the part having existed in its natural state, a loss has been sustained. As an illustration of the first, I may mention those cases in which the alimentary canal is preternaturally short; either the upper extremity terminating short of the mouth, or, which is a far more frequent occurrence, the lower extremity terminating short of the anus, which is then imperforate. Such deficiency, as I shall hereafter have occasion to shew you, is the result of a suspension of developement taking place at a very early period of foetal existence. The same may be said of those cases in which a hand is attached, without the intervention of an arm, or, at least, with the intervention of a very short one, to the shoulder—a state, which seems to be the persistance of that which is perfectly natural to the foetus of a few weeks old. To give you examples of deficiency of the second kind, or that which is acquired, I may instance the cases in which the alimentary canal is shortened by the contraction which succeeds to extensive chronic peritonitis; and those, in which a portion of the rectum has been removed in some cases of disease; or where the existence of an artificial anus has led to the contraction and wasting of the intestine below. The entire arm may be lost by accidental injury; or, remaining, it may be greatly reduced in volume, as the consequence of mischief in the opposite *thalamus nervi optici*.

The second division comprises deviations consisting in excess. This may happen in various ways. There may be merely a preternatural and disproportionate size of a part, constituting what is known by the name of Hypertrophy; as, for example, when one kidney, having to perform the functions of both, acquires nearly double the ordinary size; or, when the heart becomes thickened and dilated in consequence of causes which increase the labour which it has to perform in maintaining the circulation. In such cases, the

increase of size is accompanied by an increase of power in the organ affected; but this is by no means invariably the case in every instance in which the volume of an organ is augmented. The liver is sometimes enlarged to nearly double its ordinary size; but its intimate structure is, at the same time, so materially changed, that the secretion of bile is either wholly suspended, or greatly perverted. In other instances, the excess consists, either in the increased number of organs, or parts of organs. Thus, instead of one spleen, four, or even five, have been met with. Numerous instances have occurred, both in the human subject and in inferior animals, in which the entire upper or lower half of the body, with the corresponding limbs, has been double. The liver has been found possessed of more than the accustomed number of lobes; and the intestinal canal is not unfrequently found to have a blind appendix or diverticulum, not altogether unlike that which is found double in birds. Instances are by no means rare of the hands having six, instead of five fingers. Such examples of excess, although irregular, take place in conformity with a law pointed out by Bichat; according to which, the compound parts of limbs increase in number as they become distant from the trunk or centre. Thus, the upper-arm has one bone, the humerus; the forearm two bones, the radius and ulna; the carpal rows have each four; and the metacarpal five, which in the abnormal cases, above mentioned, is increased to six. Similar cases occur in the lower animals; and we find animals naturally having cleft hoofs, like the ox, having several smaller hoofs, and numerous phalangeal bones. Sometimes an excess in the number or parts of organs depends on the persistance of parts, which, in the ordinary course of growth, are suppressed in their developement and waste. Of this description are supernumerary ribs; and the presence of the os coccygis, prolonged into a tail.

Deviation in
respect of
form.

The third division consists in a perversion of form not necessarily accompanied by alteration of structure or pro-

portionate size. This character is too obvious to require that much should be said to explain it; and I shall merely cite a few examples, by way of illustration. One of the most remarkable, and, at the same time, most important perversions of form, is found in the pelvis. The brim and outlet, as they are called, may become so contracted, that parturition cannot take place without the death of the mother, or of the child, or of both. Sometimes the legs become so distorted, that they seem almost to realize the fabulous description of Erichthonius, who is said to have had serpents for legs. In some heads, the vertex is preternaturally high and pointed. Such may be supposed to have been the case with Pericles, if we may trust the satirical remark of one of his contemporaries: "Like Jove, an onion on his head he wears." A whole tribe dispersed over an extensive tract in the northern regions of North America are characterized by the great depression of the same part, and are known by the name of flat-head Indians. Internal, as well as external parts, are liable to deviate from the normal state, in respect of form: this is particularly the case with the liver, which readily receives impressions from neighbouring parts.

The fourth division, which is devoted to the effects of inflammation, is the most comprehensive and important of the whole. According to the advocates of the new medical doctrine which has had such numerous and able adherents in France, there is scarcely a morbid condition of which inflammation is not the essence: in fact, they have almost rendered inflammation and disease synonymous. The natural effect of this, as might very reasonably have been anticipated, has been, to produce its opposite: and Professor Andral, one of the most accomplished pathologists of the day, now proposes to reject the word 'inflammation' altogether; remarking, that it is like a piece of money which has lost its stamp by wear, and become unfit for further currency. The old coin, however, notwithstanding its

Results of
Inflamma-
tion.

Reasons for
preserving
the term
'Inflamma-
tion.'

indistinctness, may long continue far more convenient than the new, especially if the latter bear a different name and value. I shall therefore adhere to the use of the old word 'inflammation,' rather than adopt the new term 'hyperæmia'; a term which, though sufficiently expressive of the presence of an undue quantity of blood, which often marks the state known by the name of 'inflammation,' is necessarily applicable to many cases distinct from inflammation, and at the same time is inapplicable to some states which belong to the various stages and modes of inflammation. In saying this, I perfectly agree with many of the remarks of the author to whom I refer: though I differ from him, in wishing to retain a term expressive of a process exhibiting phenomena of very varied character, but which I think it important to keep together as a whole. The precise nature of the condition, understood by the word 'inflammation,' is so obscure, that there have been many disputes respecting it, the consideration of which would occupy hours. I must therefore now dismiss it; after remarking, that I hope that the review of its effects, as they will come before us in our succeeding meetings, will render in some degree intelligible its various and sometimes opposite consequences.

Scrofula.

In the fifth section are placed those morbid appearances which are regarded as the result of scrofula or of the strumous constitution. I am aware that such a section must necessarily contain many objects which might claim classification in the preceding section; for it must be admitted, that the derangements dependent on scrofula or struma are closely allied to the effects of inflammation; and might even, with strict accuracy, be regarded as such, in the most extensive acceptance of the term 'inflammation.' They possess, notwithstanding, many characters which distinguish them from the ordinary effects of inflammation; whilst they connect them among themselves, and distinguish them as a group of great interest and practical importance. Hence

I deem it unnecessary to make further apology for adopting this arrangement.

The sixth section comprises those morbid appearances which depend on that formidable class of diseases known by the name of 'malignant,' 'cancer,' 'fungoid disease,' and 'melanosis.' These have, by some pathologists, been considered as merely modes of inflammation; but I am induced to give to them a distinct and separate division; first, because their presence is not necessarily accompanied by those symptoms which we refer to inflammation; and, secondly, because they present the remarkable character of depending on an adventitious structure, which derives its growth and nourishment from vascular connexion with the parts in which it is situated, and is consequently very different from the mere degeneration of natural structures. As these diseases may attack all the structures of the body, and moreover present some remarkable features in common, I shall hereafter devote a few Lectures to their especial consideration.

Malignant
Diseases.

The seventh section contains appearances depending on the presence of adventitious bodies, called 'hydatids'; respecting the precise nature of which there exists a diversity of opinion, but I believe the majority are correct in regarding them as parasitical animals. They have no vascular connexion with the parts in which they are found, and are rarely, if ever, even mechanically attached to them. They have, also, the wonderful power of reproducing their kind, often to a very great extent. The appearances to which they give rise are necessarily complex; in part depending on the hydatid itself, and in part on the changes which its presence has produced in its vicinity.

Hydatids.

The eighth section is devoted to those appearances which result from external violence or injury, whether wound, fracture, concussion, or displacement. They are, of course, more particularly interesting in a surgical point of view; and are so fully described by surgical writers, that I need say very little respecting them. Some of these derange-

External
injury.

ments, however, are highly interesting to the general pathologist, and must therefore not be wholly passed over in a course of morbid anatomy.

Written
sources of
information.

Before I conclude, I must not omit to enumerate those authors, by an acquaintance with whom your pathological studies will be most materially assisted. Let me then recommend to your attention the works of Morgagni, Baillie, Portal, Laennec, Cruveilhier, Rostan, Abercrombie, Andral, Bright, Lobstein, Louis, Billard, Carswell, and Foville. I shall from time to time point out more precisely the sources whence you may best derive information on particular points.

Liberal feel-
ings to be
cherished.

You may perhaps be surprised that I should have recommended so large a majority of foreign writers; and be inclined to accuse me of a want of attachment to my country. Such a charge I would resist with indignation. Though I be able to perform little or nothing, in respect of patriotic feeling I will allow myself second to none. At the same time, I cannot omit the opportunity of cautioning you against the illiberality of those remarks, which tend to inculcate on your minds, that every thing which is valuable in science has been done in this country, and that foreigners have become eminent only by plagiarism.

The investigators of truth must, if at all successful in their labours, frequently arrive at similar conclusions, although their researches may have had no connection with each other. Nor ought we to regard with dissatisfaction the labours of our foreign brethren, as if nothing remained for us to do. Let us remember the words of Seneca: *Multum adhuc restat operis, multumque restabit, neque ulli nato, post mille secula, præcludetur occasio aliquid adjiciendi.*

To me it appears to be a duty which we owe to our country, to import every improvement, and every new discovery, which the labours, or the superior opportunities of our neighbours, may have enabled them to make. These,

if rightly used, will become so many important implements in our hands, facilitating, rather than retarding, the additions which it should be our ambition to effect.

Nor is it from any want of respect and admiration for our great men of former periods, that I assert modern works of science to be generally preferable to the ancient. It is the peculiar privilege of our race to profit by the accumulated wisdom of ages. And, as a falling body comes to the ground with a force compounded of all the forces which have acted upon it in every part of its descent; so one generation, if it perform its duty to that which succeeds it, will transmit, with increase, the knowledge which it derived from that which went before it. The posthumous influence of great names has too often been productive of evil, by exciting idolatry, rather than imitation.

Modern books more valuable than the ancient.

The temple of Science is erected on a neutral territory, to which no age, and no nation, can lay a peculiar claim. Whilst we see, in its immoveable foundations, those massive stones of memorial which have been laid by the gigantic hands of our great predecessors, Bacon, Harvey, and Newton, we should feel that we are above national jealousy, and be actuated only by a generous emulation; that, while the fabric is happily advancing by the united labours of many nations, our proportion of the work may be such, as to prove that we are not degenerate. And I would fain indulge the hope, that the ill-bodings of those, who think that they see the symptoms of decrepitude in our country, may prove unfounded—that, for ages to come, she may produce sons who will contribute largely to carry on the work—and that, in every period, the offerings of our countrymen may be amongst the richest accessions to the treasures in the temple of Science.

Conclusion.

LECTURE II.

ON THE SEROUS MEMBRANES.

REASONS FOR SELECTING SEROUS MEMBRANES—GENERAL CHARACTER OF THIS TISSUE—ULTIMATE STRUCTURE.—FALLACY OF THE GLOBULAR THEORY—VASCULARITY OF SEROUS MEMBRANES—THEIR SENSIBILITY, EXTENSIBILITY, AND TONICITY—APPROXIMATION OF SEROUS TO MUCOUS MEMBRANES—CONVERTIBILITY OF THE FORMER INTO THE LATTER TISSUE.—MORBID STATES OF SEROUS MEMBRANES GENERALLY.—LESIONS OF SECRETION.—SUPPRESSION—SECRETION OF GAS—EXCESS OF SECRETION—ALTERATIONS IN THE QUALITY OF THE SECRETION.—DEFICIENCY OF A SEROUS MEMBRANE—EXCESS, CONSISTING IN PROLONGATIONS AND NEW FORMATIONS—EFFECTS OF INFLAMMATION—DRYNESS OF THE MEMBRANE—EXCESSIVE SECRETION—EFFUSION OF PLASTIC MATTER—FORMATION OF FALSE MEMBRANES—VIEWS OF DUPUYTREN AND VILLERMÉ ON THIS SUBJECT—OBJECTIONS TO THESE VIEWS—STATEMENT AND ARGUMENTS IN FAVOUR OF AN OPPOSITE THEORY—EFFUSION OF NON-PLASTIC MATTER—RESULTS OF THIS EFFUSION—VASCULARITY OF FALSE MEMBRANES—DETACHED BODIES IN A SEROUS CAVITY—SCABROUS APPEARANCE OF INFLAMED SEROUS MEMBRANES—SPREAD OF INFLAMMATION OVER A SEROUS SURFACE.—CHANGES PRODUCED BY TIME IN FALSE MEMBRANES—EFFECTS OF INFLAMMATION ON THE ATTACHED SURFACES OF SEROUS MEMBRANES.—SEROUS INFILTRATION OF THE SUBJACENT CELLULAR TISSUE—DEPOSITION OF PLASTIC AND NON-PLASTIC MATTER—EFFECTS OF SCROFULA ON THE SEROUS MEMBRANES—PRODUCTS OF MALIGNANT DISEASE—HYDATIDS—LOCAL INJURY—SYMPATHIES OF SEROUS MEMBRANES—CONCLUSION.

GENTLEMEN,

My last Lecture has already acquainted you with my intention of making the morbid anatomy of the serous and mucous membranes the subject matter of the present course. It shall be my endeavour to adopt such an arrangement, that the knowledge of the morbid appearances first described may, in some measure, afford a key to the comprehension of those which follow. With this object in view, I have made choice of the serous membranes for the commencement of our inquiry. It may however be asked, why I have not preferred the cellular membrane; which is regarded as

Reasons for
selecting
the serous
membranes.

the basis of all organs, and which has commonly been selected as affording, in its derangements, the type of those which occur in other tissues. I answer, that I have been induced to make choice of the serous membranes,

First, Because they present themselves to our notice in Nature's earliest processes for the formation of an animal. For whilst the embryo is either scarcely seen, or wholly invisible in the ovulum, its membranes, which bear the strongest resemblance to, if they are not absolutely identical with, the serous, are already distinctly formed. Hence they have been called the forming or generating membranes. They will have a still stronger claim to this appellation, if we admit, with some physiologists, that the alimentary canal and the urinary bladder owe their origin to membranes of this kind; which, though they are only in a few animals sufficiently persistent to be made the subject of accurate examination, are nevertheless supposed to exist at an early period in all.

1. Early development.

I may assign, as a second reason for my choice, that Nature seems to delight in the production of reflected membranes—a form which many of the serous membranes present. We not only have them in the more familiar examples, the *arachnoid*, the pleura, the pericardium, the peritoneum, and the tunica vaginalis, but they are also seen in the eye, in the pulps by which the teeth are formed, in the synovial capsules, which are slight modifications of the serous membranes, and, as I shall hereafter more fully explain to you, in very many adventitious formations.

2. Frequency of formation.

The third and most important reason is, that the large extent of surface presented by some of these membranes affords the best opportunity for observing the varieties in the modes of inflammation, in the products to which they give rise, and in the stages through which they pass.

3. Facility of observing their derangements.

You are, I presume, so far acquainted with the general characters of the serous membranes, as to render it needless for me to premise much respecting them, in their healthy

General anatomy of serous membranes.

or physiological state. With the single exception of the peritoneum, which communicates with the uterus by means of the Fallopian tubes, they form perfectly closed and independent sacs. They present two surfaces; the one external, connected, either firmly and intimately, or loosely and feebly, with the neighbouring parts;—the other internal, smooth, polished, and perfectly continuous; in its natural state unattached, but having its different parts everywhere in contact with some other part of the same surface, except when separated by its own proper secretion, contained within the sac. These closed membranes have been divided into two orders. The first consists of those which form simple sacs, as we see in the *bursæ mucosæ*. The second order is complicated; presenting one portion inverted, and received into the other, so as to represent two bags; the one placed within the other, but united at their mouths. These are called reflected membranes.

Ultimate
structure
fibrous, not
globular.

The ultimate structure of these membranes, like that of the cellular tissue, has been regarded by most minute observers, both British and foreign, as consisting of extremely minute fibrillæ, so combined as to form lamellæ. By many modern physiologists, French and German, as well as English, these fibrillæ are believed to be composed, in their ultimate analysis, of globules, arranged like strings of beads. This opinion, I am fully convinced, has its sole foundation in an optical illusion. My friend Joseph Lister, who has carried the powers of the microscope far beyond any thing to which they had previously attained, has very minutely examined this, as well as most of the other animal tissues. He and myself have spent hours in the most careful examination of the subject, and not the smallest doubt is left on our minds as to the absolute fallacy of the globular theory. In fact, this theory appears to be completely set aside by *à-priori* reasoning. The extremely delicate textures of which animals of the most minute microscopic size are formed precludes the possibility of the ultimate structure being

visible to our eyes, however aided by microscopes. There are animalcules of such minute size, that their entire bulk is not equal in volume to that ascribed by the advocates of the globular theory to one of their integrant or primitive molecules. Lucretius has well observed, concerning the ultimate particles of matter, *Nequeunt oculis rerum primordia cerni*. The perfectly-formed membranes appear, I believe without exception, to consist of fibrillæ of tolerably even size, and in no respect resembling a chaplet of beads. Meckel denies the existence of the fibrous structure in the serous and cellular membranes; but believes that they consist of a coherent, homogeneous substance, which is viscid, amorphous, and, in the cellular membrane, scarcely solid; but more condensed, and coagulated in broad layers, in the serous. I imagine that Meckel must have been led to form this opinion from his having principally examined recent and imperfectly-formed membranes, to which the descriptive character given by him pretty accurately applies.

The vessels of the serous membranes are, for the most part, extremely minute in the healthy state. Rudolphi denies that any vessels exist; but considers that they form a sort of epidermis to the sub-serous cellular membrane which they cover; and Ribes is of a similar opinion. As the serous membranes appear, when fully formed, to be essentially composed of fibres woven into lamellæ, we can easily conceive, though the vessels ramify plentifully through and between these lamellæ, that there must be towards the unattached surface a more dense and continuous aggregation of vessels, which, however, must not be regarded as an epidermis. The active secretion and absorption which are known to be carried on within the cavities of the serous membranes has generally induced the gratuitous admission, to which Mascagni has assented, that they are plentifully supplied with exhalants and absorbents. This admission has however, of late, been refused by Magendie and Fodera, who contend for the old doctrine, that the two functions, to which I have

Vascularity
of serous
membranes.

alluded, are merely the result of transudation and imbibition.

Whether we unite with them, or prefer the idea of there being two sets of extremely minute vessels, the one devoted to exhalation, and the other to absorption, is perhaps a point of little importance; but there can be no doubt of the facts, that the blood-vessels of a serous membrane often become preternaturally visible and distended, when inflammation is causing an increased effusion; and that, on the other hand, the lymphatics may frequently be seen distended beneath a serous membrane, when a too abundant secretion has been poured into its cavity. Thus we may often observe the lymphatics of the gall-bladder beautifully filled in cases of Ascites.

Innervation
of serous
membranes.

By some it has been denied that the serous membranes are supplied with nerves. In the healthy state, they are certainly endowed with little sensibility; but, when inflamed, they generally become very sensitive, and are not unfrequently the seat of exquisite pain. Yet it ought to be noticed and remembered, that active and fatal inflammation sometimes goes on in these membranes with little or no accompanying pain. I have myself repeatedly observed this fact, in the pleura, the peritoneum, the arachnoid, and the pericardium.

Extensibili-
ty, and con-
tractility.

There can be no doubt that these membranes are possessed of a considerable degree of extensibility and contractility. We see these properties clearly exhibited in pregnancy and parturition; in the daily functions of the urinary bladder, and of the alimentary canal; and in the effects of hydropic effusions, and of the operation of tapping to remove them. The contractility exercised by the serous membranes is very different from that of muscular fibre, and more nearly resembles elasticity; yet it is certainly connected with the life of the tissue. Beclard calls it *Tonicity*, the name by which the contractile power of the arteries has also been designated. The microscopic observations made by my friend Joseph Lister and myself have

fully convinced us, that there is far greater similarity between the fibres to be seen in the arterial and serous tissues, than between either of them and the muscular fibre.

Most of these membranes afford a secretion, which, as their name indicates, bears a very strong resemblance to the serum of the blood. I would wish, however, to call your attention to a point, which, so far as I am aware, has been little, if at all, noticed. I allude to the fact of the gradual transition which we may observe from the most perfect serous, to the mucous membranes, and to the convertibility of the former into the latter. The fluid secreted by the arachnoid is the most aqueous of the serous secretions. The waters in the membranes of the ovum probably rank next in this respect. The secretions from the peritoneum, pleura, and pericardium, when they can be collected in any sufficient quantity, appear, independently of any morbid alteration, to be more charged with animal matter. By pressure and friction, we find developed, in the cellular membrane of particular parts, close cavities, which produce and contain a mucous secretion, and conduct us to the synovial bursæ and capsules, in which mucus obviously exists. Hence the transition is easy to the mucous membrane of the eye, the secretion of which is more allied to serous secretion than that of most other portions of this tissue. Again, if we refer to those examples of the accidental production of a natural or analogous tissue, which are so frequent in serous membranes, we find that in some of these cysts there is contained a perfectly clear, limpid, aqueous fluid; in others, a straw-coloured serum; in others, a fluid bearing the closest resemblance to synovia; and in a fourth class, mucus not less clear and perfect than any produced by the Schneiderian membrane, or the follicles of Naboth. Nor is this gradual transition the only approximation to be observed between serous and mucous membranes: it may be shewn, that, under certain circumstances, the former undergo changes, the result of which is to identify

Transition
from serous
to mucous
membranes.

Converti-
bility of serous
into mucous
membranes.

them with the latter. If the plausible doctrine to which I have already alluded respecting the formation of the alimentary canal and urinary bladder were absolutely demonstrated, it would afford the best proof we could desire: and, although we want evidence to shew that the serous bags in question are first formed, and that the cavities destined to persist in the perfect animal are formed from them, it is certain that these sacs, at a very early period, constitute cavities continuous with the organs with which they are connected. It must be confessed, however, that in the physiological condition of the tissues we do not find such clear evidence of the convertibility of the one into the other, as we have been able to offer respecting the gradations which exist between them. We shall find ourselves compensated for this deficiency by a reference to their pathological state. I have repeatedly met with the secretion of the pericardium glairy and ropy, from the quantity of mucus which it contained. I have found the surface of the pleura lubricated by a viscid mucus, which made the lungs feel as if smeared with saliva, or like a fish recently taken from the water; and, in several cases of inflammation of the peritoneum, I have found this membrane covered with a ropy muco-purulent effusion. In ovarian dropsies, which depend on the developement of large adventitious cysts of the kind of which I have spoken, the fluid evacuated by the first operation of tapping is frequently thin and serous; that which is subsequently drawn off is thick and loaded with mucus; and a fourth or fifth puncture evacuates puriform matter.

Morbid appearances common to serous membranes.

These brief comments on the general character of serous membranes, and the knowledge you have already derived from other sources, will enable you now to enter on the pathological phænomena which form our chief object of inquiry. There are certain morbid appearances which are common to the whole class of serous membranes; and to these I shall first direct your attention.

The serous membranes sometimes cease to secrete, and they then become dry. Dr. Baillie has noticed this state in the pleura, and has mentioned its occurrence in the pericardium. Bichat describes the same phenomenon, and its existence has been further confirmed by the observation of my friend Dr. Knox; but I cannot say that I have ever witnessed it myself, except to a partial extent, and under circumstances which admitted of the supposition of the appearance being cadaveric. The synovial capsules are also stated to have been the subjects of diminished secretion.

Suppression
of secre-
tion.

Gaseous fluids are sometimes found in the cavities of the serous membranes. They are said to have been found between the layers of the arachnoid. It is not very uncommon to find them in the pleura and peritoneum; and they have been met with, though more rarely, in the pericardium. I am quite ready to agree with Dr. Baillie, in supposing that, through some alteration in their functions, the membranes may secrete air; but we must be careful not to regard every instance in which a gaseous fluid is met with in the cavity of a serous membrane, as an instance of this phenomenon. There can be no doubt that these collections are often the result of a cadaveric change, even though the inspection be made a very short time after death. We may be assisted in discovering whether this is the case, by observing what is the state of the body in other parts, besides the particular serous cavity in which the presence of gas may have been noticed. The disposition to the cadaveric production of gas often depends, in my opinion, on some peculiar modification which the structures of the body have received before death. In these cases, the emphysema is more or less general, and is usually accompanied by a peculiarity of smell. When the corpse has been kept too long, and the production of gas has been noticed, in conjunction with other phenomena dependent on decomposition, a doubt can scarcely exist respecting the cadaveric, rather than the morbid character of the air found in a serous

Secretion
of gas.

cavity. Gas, however, may sometimes be met with in some of the serous cavities, but more especially in the pleura and the peritoneum; and be neither the effect of the secretion of air from the membranes themselves, nor a purely cadaveric phænomenon: it may proceed from the decomposition of the accumulated product of the diseased secretion of the membrane, as we sometimes see in empyema, and in cases of tympanitis; or it may depend on a more mechanical cause, as when the softening of a tubercle has opened a communication between the air-tube and the cavity of the pleura. This, and the decomposition of the secretion, are, I believe, by far the most frequent causes of pneumothorax. An opening between the intestinal tube and the peritoneum occasionally becomes, in a similar manner, a cause of tympanitis.

Excess of
secretion.

In the cavities of the serous membranes there are frequently formed, more or less copious collections of their secretions, without any material alteration of the sensible properties of the fluids. They constitute the dropsies of these cavities; and are known by the distinctive names of Hydrocephalus, Hydrothorax, Hydrops pericardii, Ascites, Hydrocele, Hydrarthrus, and Ganglion. In many cases, the origin of these accumulations, the symptoms which attend them, and also the means which are most effectual in their removal, tend indubitably to prove their inflammatory nature. In other instances, they appear to depend on a passive and atonic state. By whichever condition they may be induced, but more particularly when they belong to the latter form, the collected fluid is often very copious: in the peritoneum, especially, it not unfrequently amounts to many gallons.

Alterations
in the qua-
lity of the
secretion.

Besides deviations from the regular and healthy quantity, the secretions of the serous membranes are liable to perversion in quality. I have already had occasion to notice their acquiring the characters of mucus. They are found more or less deeply tinged with bile in jaundice. Occasio-

nally they become sanguinolent; but the admixture of blood is as often a cadaveric, as a morbid phænomenon. To make an accurate distinction between these two forms, we must, as in the case of the presence of gases, be guided by the nature of the accessory circumstances. If the patient have died suddenly, and the blood have universally retained its fluidity—if the various tissues are soft and flabby, and have become stained by the transudation of the bile or the blood—there can be little doubt of the sanguinolent colour of the serum in the different cavities being a cadaveric appearance, except when the patient is known to have been labouring under scorbutus, in which case both causes have probably concurred. When we find the sanguinolent secretion confined to a particular cavity—when the membrane containing it appears to be rather injected than stained—and, more decidedly, when a local determination or injury is known to have taken place at the part—we may infer that the appearance of blood is morbid, rather than cadaveric. After all, I must confess that I have seen many cases in which it was very difficult, if not impossible, to draw the line.

Dr. Baillie mentions a case in which a considerable quantity of blood was found in the pericardium, where no rupture of the heart or of any vessel was discoverable. An exhalation of blood is not very unfrequent in the pleura; and Laennec has attributed to this circumstance some of the varieties which we shall have to consider, when treating of the effects of pleuritis. The pleuræ, like the pericardium, may have blood poured into them from wounds, or the bursting of aneurisms. I know of no instance of the arachnoid containing blood, except from apoplexy, or injuries of the head. The fluid collected in ascites is at times decidedly sanguinolent; and, in one instance at least, I have seen the particles of blood so effused, of a remarkably bright vermilion colour. Very copious collections of blood are sometimes observed in the peritoneum, resulting from laceration of the liver or spleen, from the rupture of large

D

in page 376 appendix -

vessels, or after the operation for strangulated hernia, &c. In the tunica vaginalis testis we have the opportunity of observing, during life, the effusion of blood into the cavity of a serous membrane, constituting the disease termed Hæmatocele.

Supposed
presence of
chyle and
milk.

Chyle and milk are both said to have been found in the cavity of the peritoneum. The former is a very unlikely, though just possible, occurrence: the latter, quite absurd and incredible. In the cases which are related, as instances of this kind, a light-coloured, puriform, inflammatory, effusion has, in all probability, been mistaken for milk. Bichat says, that the secretions of the serous membranes, but more particularly of the peritoneum, sometimes become discoloured, and of a highly offensive odour.

Deficiency
of serous
membranes.

Deficiency of the whole or a part of any of the more important serous membranes is a comparatively rare occurrence. The arachnoid must of course be wanting, in common with the other parts of the head, in acephalous fœtuses. When, as sometimes happens, that part of the dura mater which forms the falx is deficient, there is also absence of the corresponding portion of arachnoid. I know of no instance of the pleura being wanting, except when a monstrous fœtus has consisted of nothing more than the abdomen and legs. Some years ago, I saw an example of this kind in the Hunterian Museum at Glasgow: there are three in our own Collection, and many others are on record. Several instances of deficient pericardium have been recorded by various authors. Some of these are supposed to have been nothing more than cases in which the opposed surfaces of membrane have been universally adherent; but one example, examined and described by Dr. Baillie, and another detailed by Breschet in the Repertory of Surgery and Pathological Anatomy, stand on too good authority to be called in question, and leave no room to doubt the possibility of this deficiency. Fœtuses have often been produced, in which the anterior part of the peritoneum, and the cor-

responding portion of the parietes, have been wanting, leaving the abdomen open. When the testes, failing to descend into the scrotum, have remained in the lower part of the abdomen, the reflected portion of the tunica vaginalis is of necessity wanting. We have an instance of this kind in the Museum. It was taken from the body of a young man, on whose mind the idea of deficient virility produced so depressing an effect, that he destroyed himself.

We find also instances of deviation from the normal condition of the serous tissue consisting in excess. It may be of two kinds:

Excess in serous membranes; consisting:

First, one of these membranes, naturally belonging to the system, may have a part or parts exuberant. This circumstance occurs in the arachnoid, in conjunction with a congenital protrusion of the brain. In a case of this kind, which I had an opportunity of examining, the membranes were so altered, that it was by no means easy to distinguish them; but that which there seemed reason to consider as arachnoid, was of very remarkable thickness. In the cavity of the chest we sometimes meet with appendices formed by an extended process of pleura, giving a covering to collections of air or fat. In form, the latter somewhat resemble the comb of a cock; and in character, they are allied to the appendices epiploicæ of the colon. Similar appendices are occasionally found in the pericardium, and in synovial capsules. It is however in the peritoneum that the deviations from the normal or healthy state, consisting in excess, are the most frequent and remarkable. We see them in all cases of hernia, except in those of the congenital kind: and the sacs which are formed in these cases are sometimes, as you well know, of very large size. Within these sacs, adventitious cysts are likewise occasionally formed. In a specimen of this kind, preserved in our Collection, there were two of these cysts; one of which was capable of containing considerably more than a pint of fluid. In the tunica vaginalis we find, occasionally,

1. In prolongations of normal membranes.

prolongations of the serous membrane, in the form of small cysts with slender peduncles. Similar and analogous cysts are perhaps of more frequent occurrence in females, attached to the ovaries and Fallopian tubes, and consisting of prolongations of the peritoneum.

2. In the formation of new cavities.

I have already alluded to the second form of redundancy of the serous tissue; viz. that which depends on the production of entirely new cavities. I shall not now enter into the consideration of the morbid appearance to which they give rise, as they are sufficiently curious and remarkable to claim our special attention on a future occasion.

Effects of inflammation.

We have now to consider the effects of inflammation on the serous membranes. These constitute some of the most frequent, and, at the same time, some of the most important phænomena which morbid anatomy brings under our notice. The term Inflammation is variously defined and understood by different authors. Laennec used to describe it as an afflux of fluids to a particular spot, with a tendency to the production of pus; but I cannot say that I quite approve of this definition, which is little applicable in practice. Broussais regards all transformation and deposits as the effects of inflammation, and thus almost makes inflammation synonymous with disease. Dr. Baron, on the contrary, excludes from the list of derangements attributable to an inflammatory process, many conditions which common consent has connected with it. It may be thought necessary that I should attempt a definition of what I myself understand by inflammation. I shall not, however, encroach on the province of your able teachers of Medicine and Surgery, in order to grapple with this knotty question; but shall content myself, for the present at least, with bringing before you those appearances which I conceive to be the consequence of this morbid action.

Serous membranes liable to all forms of inflammation.

It is generally taught, that the adhesive inflammation is that which belongs in an especial manner to the serous membranes; and that inflammation, when set up, has a ten-

dency to spread over their entire surface. I trust, however, to succeed in shewing you, that the serous membranes exhibit nearly all the forms of inflammation which we meet with in other tissues; and that many of the various appearances which present themselves in the products of their inflammation depend rather on differences in the morbid process, than on the periods at which the products of one and the same process are observed; though it is equally true, that many varieties are ascribable to this latter cause.

It appears, that the first effect of an irritating cause applied to a serous membrane, in sufficient force to excite its inflammation, is, to suppress the secretion, by which its smooth surface is naturally lubricated. It rarely happens that a serous membrane, in this stage, is exposed to our view; yet, as we have already seen, on the authority of Baillie, Bichat, and some others, the serous membranes have been met with perfectly dry. As the irritation subsides, transpiration returns, and the surface is again lubricated; but if the inflammation have been violent, resolution does not take place, and the serum exhaled does not possess its ordinary qualities. Though by no means uniform in its characters, the exhalation is, in most cases, superabundant in quantity; and is mixed with some more solid material, giving rise to various forms of false membrane, and often rendering the fluid more or less turbid and opaque. Villermé, who has written an elaborate dissertation on the production of false membranes, describes this altered secretion as more or less resembling the result of the suppuration of cellular tissue. False membranes, he states, are always the effect of inflammation; and he regards them as the matter of suppuration thickened and concreted. The turbidity of the serous effusion he ascribes to the admixture of flocculi of concreted albumen; the quantity of which, he adds, is in proportion to the violence, duration, and extent of the inflammation. When these appearances are not observed in persons who have died of suspected pleurisy, inflammation of the muscles or cellular

Earliest
effects of in-
flammation.

Post-mortem evidence of inflammation.

membrane must, in most instances, have been mistaken for it. Yet, according to the author to whom I have already alluded, an individual may die, after having exhibited all the marks of pleuritic inflammation, and little, if any trace of it, may be found on inspection. He accounts for this anomaly, by supposing that the red blood leaves the capillaries, unless they had admitted it for some time before death. Such cases are, I have no doubt, extremely rare. From my own experience, I can cite none in which the inflammation, however recent, had not left some traces of its existence. If the inflammation have been very rapid and intense, and the patient have died on the second or third day, it is very possible that no false membrane may have been formed; but we find an effusion of serum, which, in the majority of cases, is sanguinolent or puriform. In a few instances, I have noticed an effusion, nearly or quite clear and transparent, but possessing the power of coagulating, on its removal from the body, after the manner of blood, but in a much feebler degree. The serous membrane affording this effusion is more manifestly vascular than in its physiological state; and this increased vascularity, instead of being uniformly diffused, more frequently produces the appearance of numerous very minute, closely-placed, and irregular red points; and is generally accompanied by small ecchymosed spots on the cellular membrane situated behind the serous. Villermé observed this condition of the pleura in two persons who had been suddenly exposed to cold water whilst they were hot and perspiring. The same thing has been noticed by Dupuytren; and I have myself seen it where death had speedily followed a severe accident, one of the effects of which had been fracture of the ribs.

Formation of false membranes.

The various appearances exhibited by the products of inflammation on the serous surfaces, and more especially the formation of false membranes, form the most interesting part of our present inquiry. The most minute and detailed account of these formations, with which I am acquainted, has

been given by Villermé; who has undertaken to unfold the opinions of Dupuytren, in whose researches he appears to have assisted. As these views are, I believe, pretty generally received, in consequence of the authority from which they emanate, and as they bear some little resemblance to the doctrines of Sir E. Home concerning the organization of pus, I shall lay them briefly before you. At the same time, I must state, that while I see no reason to doubt the fidelity of most of the descriptions of particular appearances given by Villermé, I differ widely from his views of the relations which these appearances bear to one another.

The changes which adventitious membranes undergo, from the commencement of their formation to their complete organization, are divided by Dupuytren into four stages: 1st, Formation; 2d, Growth; 3d, Organization; 4th, Transformation into cellular tissue.

Views of
Villermé
and Dupuy-
tren:

As to the first stage or period of formation, the following facts and doctrines are propounded.

1. As to the
formation of
false mem-
branes.

If, after having excited inflammation in the pleura of a dog, the chest be opened in twenty-four or thirty hours, the pleura is found minutely injected; and at the spots in which the inflammation is most intense, the membrane is pulpy, and has an appearance of villi, which are very short, generally of a dead-white colour, delicate in structure, and easily removed. According to Villermé, these villosities, increasing and combining, constitute the false membrane. The recent membrane, so formed, adheres by one surface to the serous membrane which secreted it; while the other unattached surface is mammillated somewhat like a granulating surface, and offers numerous floating villi. At this time, the effused serum appears to be only altered in quantity; but it afterwards becomes turbid, from the numerous flocculi dispersed through it, which appear to be some of the villi before mentioned, detached by friction.

2. As to the
growth of
false mem-
branes.

During the period of growth, the flocculent villi are said, by their union, to form layers of more or less extent, and

thickness. The false membrane thus produced, attaches itself, with increasing firmness, to the serous membrane; the surface of which, when the false membrane has been detached, appears tomentose or flocculent: but it not unfrequently happens, that shreds and layers of adventitious membrane become partially separated, and float in the effused fluid. This appearance, he remarks, is far more common in the abdomen than in the thorax; owing, in all probability, to the more extensive and varied movements of the contained viscera. When a portion of false membrane has been detached from the serous, this latter furnishes a new exudation, which, from its tenderness, may be easily recognised as the more recent. On the subsidence of the inflammation, a serous or purulent fluid may sometimes be seen to raise the false membrane, and assist in its separation. Such detached portions, which are most frequently seen in the abdomen, are occasionally of large size, white, soft, and tremulous. Sometimes the adventitious membrane becomes pulpy, friable, and *cheesy*; and the effused fluid increasingly turbid and milky, or purulent. Every possible intermediate variety is to be met with between the minute flocculi which produce the milky appearance of the effusion, the large flakes resembling fragments of cheese, and the most completely-formed false membranes.

This Villermé considers a convincing proof that the whole difference in the product of inflammation consists in the greater or less consistence of the flocculi—in their proximity—their number—and the quantity of serum in which they are suspended, or by which they are bathed. He is hence induced to believe, that whatever is rapidly produced as an effect of inflammation, is pus; which will present differences in its characters dependent on the structure and properties of the parts affected, and on differences in the irritation of which they are the seat.

Thickness
of false
membranes.

It is at the close of the second period that false membranes are of the greatest thickness. Sometimes they do not equal

the thickness of a shilling; at other times they exceed that of a crown-piece. Villermé mentions a false membrane which united the opposite surfaces of the pleura, and exceeded half the thickness of a finger. Stoll says, that a false membrane investing the lung, and universally adherent to the pleura costalis, has sometimes been met with upwards of an inch in thickness: and Broussais mentions a false membrane between the convolutions of the intestines which was two or three inches in thickness. False membranes are generally thickest at the most declining part; favouring the idea, that the detached portions had been precipitated, and that by their superposition they had increased the thickness of the lower portions. Haller has noticed the case of an old woman in whom a clotted collection of cheesy matter was found between the uterus and rectum, without any thing similar existing in any other part of the peritoneal cavity. An appearance of this kind has been repeatedly seen by myself, in the same situation.

As clots form, the serum loses its milkiness, and slowly approaches to transparency. It has been thought that false membranes, in their second period, may be entirely absorbed; but Villermé thinks it probable that it is the albuminous clots and flocculi which are mixed with the serum, rather than the false membranes which are so removed. There are now no longer any villousities. The false membrane, homogeneous in its texture, of a white or yellowish colour, and possessed of a certain degree of consistence, becomes daily more firmly adherent to the serous membrane.

Absorption
of false
membranes.

The third period now commences; in which it is rare to meet with those flakes and ragged projections on the unattached surface of the false membrane, which are common in the second stage, but which are never found in the fourth. This period commences as soon as the false membranes are possessed of vessels. They acquire a greater degree of consistence, and not unfrequently an appearance similar to

3. As to the
organization
of false
membranes.

what is called 'lardaceous substance'; while at other times they resemble, in colour and consistence, the inflammatory coat on blood. This latter state Villermé notices to precede usually that which presents the lardaceous appearance. The false membrane at this period frequently seems to be made up of several intimately-adherent layers. In the chest, it often invests the whole lung, and is almost always universally or partially adherent to the pleura costalis. The substance of the false membrane is frequently homogeneous, firm, and coriaceous. It possesses a tenacity and firmness approaching to that of pure fibrin, and has occasionally been met with almost or quite cartilaginous. If at this stage the false membrane be removed from the serous, to which it pretty strongly adheres, this latter will be seen apparently healthy. It does not seem to be at all injured; and we merely perceive some small drops of blood proceeding from the rupture of the vessels of communication. At a later period, when the false membrane has diminished in thickness, the adhesion becomes more intimate; and the separation cannot be made without injuring the serous membrane, and destroying the polish it naturally possesses. In cases in which the pleura is extensively concerned, it is not uncommon at this period for two layers to be distinguishable by the eye, the one adherent to the pleura pulmonalis, the other to the pleura costalis. They are however, at numerous points, united between themselves, though with less firmness than to the pleura; the medium of connection being an exceedingly fine cellular tissue, which we find infiltrated, and which has been compared to the hyaloid membrane of the eye.

Time at
which ves-
sels become
perceptible
in false
membranes.

The time at which vessels begin to be visible in false membranes appears to be very different in different cases. Villermé has never seen them before the twenty-first day, from the invasion of the malady; but Stoll mentions cases in which organization appeared to have taken place as early as the twelfth, or even the eighth day. I believe a still

shorter time has been noticed by some; and I think my own observation confirms the fact.

Villermé thinks, that, in general, vessels are first visible in those parts of the false membrane which correspond with that part of the serous in which the degree of inflammation is the greatest. He says, that red vessels first become visible in the false membranes, in the form of thinly-placed, nearly straight, lines. They lengthen, multiply, and ramify, by the formation of other lines proceeding from them at angles which are more or less acute. They take an oblique course; and generally commence where the false membrane is the thickest, and where the serous membrane beneath is the most injected. Sometimes, if a section be made, shewing the two layers interposed between, and uniting the two opposed surfaces of the serous membrane, different sets of vessels may be seen passing through these layers, and producing the appearance of two red bands, between which is the whiter and less-injected substance which unites them.

Form of vessels at their first appearance.

Although the effused coagulable matter receives the vessels which are prolonged into it, Dupuytren believes, and Villermé agrees with him in the opinion, that it is not of this substance that the cellular tissue, the ultimate form which he thinks that the false membranes always may assume, is composed. These observers consider, that the result of the organization of the originally effused matter, which they regard as a concrete pus, is the absorption of this matter; and its replacement by cellular membrane, consisting of a new material formed by the action of the new vessels. In arriving at the state of completely-formed cellular membrane, which constitutes the fourth stage, the false membranes become thinner and tougher, and, as Villermé says, lose the lardaceous appearance which they present during a part of the third stage.

The false membrane, thus organized, is not persistent.

In the fourth stage, in which the conversion into cellular membrane is complete, it is frequently difficult to distinguish

4. As to the formation of cellular

membrane,
the persist-
ent result
of inflam-
mation.

the new membrane from the original serous; to which it often so closely adheres, as to appear identified with it. Its smooth and unattached surface secretes a lubricating serum, similar to and replacing that formerly secreted by the membrane which it invests. It is liable to the same morbid action as the serous membrane; and often, by its inflammation, produces effusion and new false membranes, more especially if a part of the original effusion remain unorganized, and, continuing to act as a foreign body, from time to time renew irritation.

Objections
to the views
of Villermé
and Du-
puytren.

Purulent
matter inor-
ganizable.

False mem-
branes ge-
nerated by
coagulable
effusion.

Such are, I believe, the most generally received notions respecting the formation and progress of false membranes produced by inflammation on the surface of the serous membranes. It seemed incumbent upon me to lay before you these generally received doctrines, before I offered to your notice those modifications which repeated opportunities for observation have induced me to think necessary. Notwithstanding the accuracy of Villermé in describing the appearances which at any particular time presented themselves to his observation, I repeat, that I cannot agree with him and Dupuytren in the view which they have taken of the relation which the different states described, bear to each other. I find it impossible to unite with these authors, and with Sir Everard Home, Laennec, and several others, as to the organizable properties of pus or puriform secretions. I believe them to be always, more or less, excrementitious; and that where an outlet from the body is not afforded, they invariably retard cure, by interfering with the progress of organization in those substances which are formed in conjunction with them, and are susceptible of this change. You will remember, that I have mentioned several varieties in the effusions met with in the cavities of serous membranes; and I would particularly recall your attention to one form which has the power of coagulating like blood. This I believe to be the most eminently plastic effusion, which, as coagulation advances, very

rapidly assumes the form of tender diaphanous films, which we find separated by, and infiltrated with, a limpid, but often straw-coloured serum. They are not in general originally applied and attached to the surface of the inflamed serous membrane; and it frequently happens that the union is ultimately only partial, yet amply sufficient for their organization and support. Though these diaphanous films, or incipient false membranes, do not appear to be necessarily formed in immediate contact with the surface of the serous membrane, it is no less obvious, that their formation is often, if not generally, materially influenced and modified by the membranes in the cavities of which they are contained, as may be best seen in the peritoneum; since we find them assuming the form, and adapting themselves to the irregularities of those cavities, even where they are accompanied by a large proportion of serum.

The opinion which I wish to support in opposition to Villermé, and which I have been led to form by a careful examination undertaken in consequence of perusing the work of Villermé, is, I believe, in some points, little more than a return to the doctrine of John Hunter, though not borrowed from him. I find myself perfectly in accordance with this great master of his profession, in regarding the formation of the tender diaphanous films composed of the plastic part of the effusion (the coagulable lymph of John Hunter) as the result of a process of the same nature with the coagulation of the blood. Hence, from the first, they are continuous and homogeneous, even whilst they can scarcely be said to be solid; a state which they attain by the separation of the serum, rather than by the aggregation of floating particles or villi. Notwithstanding their tenuity, and soft and tender texture, they often form bags or pouches capable of retaining the serum. This fact appears to me to militate strongly against the idea entertained by Villermé, and sanctioned by no less an authority than that of Beclard, that the form of membrane or film, is

False membranes not opaque and cribriform, but continuous and transparent.

produced by the aggregation of an infinite number of minute flocculi. Were this the case, we should not only find most recent membranes, to a certain degree, cribriform, and incapable of retaining fluid, but, as Villermé seems to admit, they would be more or less opaque. To obviate this objection, he appears to have considered the transparent membranes as further advanced than he is warranted in doing.

Argument
drawn from
embryology.

The production of transparent membranes about the embryos of viviparous as well as oviparous animals affords another strong confirmation of the view which I have taken. These last membranes form the nidus in which the developement of vessels may most rapidly take place; and the false membranes, of the form of which I am now speaking, seem most strongly to resemble them in this respect.

Results of
the most
plastic effu-
sion.

It is to this form of effusion, then, that I attribute those loose and most perfectly cellular adhesions which we so frequently meet with in the examination of bodies. Their organization is probably completed in the shortest time, and with very little constitutional derangement: hence it is not surprising that we are so frequently unable to refer them to any known attack of inflammation. It seems likely that a trifling effusion of this kind, succeeding to the suppression of the accustomed exhalation from the serous surfaces, may have occasioned that close adhesion of the two surfaces of a serous membrane, which has induced some to conclude that they were united without the intervention of any adventitious matter. If, however, the attack of inflammation producing this effusion be very severe, a considerable quantity of this plastic material may be thrown out, and the attendant symptoms will be proportionately severe and protracted: yet, if the effusion be purely of this kind, and the organization of the false membrane be not interrupted, we may still have those completely cellular and diffused adhesions, which, as in the case of the radical cure of hydrocele, are so far from being a source of irritation, that they may

be regarded as a safeguard against the recurrence of disease.

There is a form of effusion most completely opposed to that which I have just described. It is more or less opaque and turbid, of a light yellow or soiled-white colour, not so thin as serum, but of a somewhat viscid consistence; more nearly resembling thin pus, and having no tendency to form adhesions between the contiguous serous surfaces. The effusion into the peritoneal cavity, in many cases of puerperal fever, is of the kind of which I am now speaking. Between this last form of effusion, in which the plastic property appears to be wholly wanting, and that which I first described, there are numerous gradations, dependent, as I believe, on the different proportions, in which the minute particles, which give turbidity to the effusion, are mixed with the plastic matter. Sometimes there is only a sufficient quantity of the latter to unite the former into light-coloured opaque flocculi and flakes of various sizes, of feeble cohesion, either very slightly adherent to, or wholly detached from the serous membrane, and absolutely incapable of organization. At other times, the quantity of the plastic material in the effusion is sufficiently great to allow of its assuming the form of membranous layers, or of an opaque, whitish, false lining to the cavity. Its organization, though not always prevented, is very much retarded by the opaque particles; which are either uniformly diffused through it, or found in more or less isolated and detached collections of different sizes; and bearing considerable resemblance to tuberculous matter, to which I apprehend they are very closely allied.

A second kind of effusion, non-plastic.

Forms intermediate to the non-plastic and most plastic.

With respect to this whitish opaque matter, which, in the form of minute particles diffused through the serum, renders this fluid turbid, milky, or puriform; and which, when combined with the more plastic material, either renders it uniformly opaque and of feeble cohesion, or sprinkles it with opaque points, or with collections of puriform, or

The opaque matter present in non-plastic effusions endowed with little vitality.

tuberculous matter; I am inclined to believe that it principally differs from the material which I first described, in its very inferior degree, or, perhaps, total want of vitality. This may either depend on its original formation, or have been acquired. The former is probably often the case; but we see examples, in which the latter is the more probable, not only in the false membranes of which we are speaking, but also in certain productions, resembling polypi, occasionally formed in the heart; in pulmonary tubercles, passing from the miliary and transparent, to the crude state; in serofulous absorbent glands, and in various tumors in which the process of decay has commenced. It is when false membranes possess this compound character, and more particularly when the inorganizable matter abounds, that they are (as Dupuytren and Villermé have said) a constant source of irritation. Hence, we have repeated exacerbations of inflammation, and find the material produced by it, of various ages, and in different states and stages of progress. These, as Dr. Baillie has remarked, are not merely the effusion from the original serous surface. The false membrane becomes itself a secreting organ; sometimes yielding a particled puriform fluid; and at others, more plastic lymph, which may assume the most perfect membranous form. I have noticed this latter state on the surface of false membranes, whilst they themselves were plentifully loaded with opaque matter. The fact, that they may be opaque, whilst those which they have produced, and which must necessarily be more recent, are transparent, is, I conceive, an insuperable objection to the views adopted by Villermé. At other times, the first-formed layers may be more organizable: in which case, if not too much irritated by the presence of the inorganizable material which it has produced, it eventually takes up so much of it as is susceptible of absorption; and shuts up the remainder, precisely as a bullet, or any other quietly-lodged foreign body, is enclosed in a cyst of condensed cellular membrane. In this

The non-plastic effusion is the source of irritation.

False membranes, though opaque, throw out new transparent membranes.

observation, you will perceive that I am again at variance with Villermé, who supposes the opaque albuminous portions to be susceptible of absorption.

When the false membranes have been organized for a short time, they are reddened by the innumerable minute vessels which they contain; but they become, subsequently, much paler. In these two states, they have often been confounded with the serous membranes themselves; which have hence been erroneously described as extraordinarily thickened, carnified, or lardaceous. The existence of vessels in false membranes was first pointed out by Stoll. Dr. Baillie injected them; and Dupuytren appears to have done the same, without the knowledge of what Baillie had done. Villermé says, that in the third stage, in which, though organized, they have not yet assumed the form of cellular membrane, they may be injected with mercury, but not with other materials. I believe, on the contrary, that they will admit of fine size injection, at a very early period.

Colour of false membranes at different stages.

Vascularity of false membranes.

The production and developement of vessels in the membraniform secretion from the surface of an inflamed serous membrane, is a very remarkable phænomenon. How, says Villermé, is a concretion, the accidental product of disease, and which in fact may be regarded as a foreign body, to become a part of the organ in which it is contained, and to participate in its organization? In what manner, in short, do false membranes become organized? Are they the bed into which the extremities of the vessels of the exhalant surfaces are prolonged? or is there a real generation of vessels? This latter idea is so repugnant to all our present notions respecting the circulation, that it cannot be admitted, notwithstanding that red vessels are first seen in the false membranes, without our being able to trace their communication. The increasingly intimate adhesion of the false membrane to the exhalant surface, and the sort of filaments which are sometimes seen to form the medium of this union, are circumstances which would induce us to admit an

Opinions as to the formation of vessels in false membranes.

affirmative to the first query. This, however, seems to be most strongly supported by the fact, that injections may be thrown into them from the neighbouring vessels.

Though I see no room, therefore, to doubt for a moment the source whence the new vessels are derived, we are still very much in the dark as to the mode in which the formation takes place. I cannot think, with Sir E. Home, that they commence as canals formed by the passage of globules of air through the semicoagulated effusion. My own opinion is, that, at the inflamed part, the minute blood-vessels not merely become distended, but that their delicate parietes, and the structure through which they ramify, become softened, and, yielding to the pressure of the blood in the distended vessels, give way at numerous minute points. This I believe to be the explanation of the fact, that when we raise an adherent false membrane of a few days standing, we find that the original serous membrane beneath has lost somewhat of its polish, and presents numerous minute bloody points. The very small quantity of blood thus escaping from its vessels does not diffuse itself, but is received into the soft substance of the false membrane, which accordingly exhibits numerous bloody points on the surface which has been detached from the serous membrane. These spots, which are at first irregular, afterwards have a dendritic appearance; and extending in length, they become vessels. These vessels being feebly supported, are distended and larger than those in the original structure from which they proceed; hence the redness of newly-organized false membranes. At a subsequent period, these vessels contract, and may become nearly or quite invisible. As the mode of production of new vessels belongs more particularly to another division of our subject, I shall dismiss it for the present: but you will observe in this process, as I have just described it, an instance of softening as an effect of inflammation. We shall have other instances of this effect accompanying

recent inflammation, as well as of the opposite state, or induration, being likewise a result of inflammation; and I think you will find that each of these opposite effects admits of a satisfactory explanation.

Vessels are not only extremely numerous in recently-organized false membranes, but often produce a very remarkable appearance, by the uniformity of their size, and by their straight and parallel course, which, when they are recent, gives them some resemblance to muscular fibre. I have met with this appearance most frequently in the cellular adhesions within the thorax; but I have also seen it in the abdomen, more particularly in the lower pelvis. It appears to depend on a certain degree of motion in the part; as, *ex.gr.*, between the surface of the lungs and the parietes of the thorax in respiration, or in the action of the levator ani, whence these lines are met with in the pelvis between the uterus and rectum.

Muscular appearance of new vessels.

Villermé has stated, that the formation of vessels is first recognisable in those parts in which the false membrane is the thickest. I am not prepared to dispute the accuracy of this remark; but I have no hesitation in saying, that there is the greatest difficulty in completing the organization of the effused material in those spots in which it is most abundant; as, for instance, when collected between contiguous convolutions of the intestines: and this difficulty is the most observable, when the effusion is rendered opaque by the abundance of inorganizable matter.

States unfavourable to the formation of vessels.

By a wise provision of nature, the surface of the effusion first becomes consolidated and membranous; and thus frequently a smooth and serous envelope is formed, shutting out, from the rest of the cavity, the internal part; which, if its organization does not proceed, acquires an increasingly puriform appearance. At the same time, ulcerative absorption takes place in that part of the serous membrane with which the mass is in contact: and thus, while the collection of pus continues to increase, a way of escape may be pro-

Surface of effusion first consolidated.

vided, without an effusion of the puriform fluid into the general cavity.

Formation
of bridles of
adhesion.

It not unfrequently happens, when the adhesions are not universal, and the motion between the serous surfaces is considerable, that lengthened bridles are formed. These are serous externally; but, by some, have been described as cellular internally; and, by others, as soft and pulpy. Both observations are doubtless founded on fact, and tend to illustrate the remark which I have just made. In the one case, the interior, as well as the surface, have assumed the membranous character; whilst in the other it is inorganizable.

Formation
of blebs.

Sometimes a delicate false membrane, the product of a highly plastic inflammation, is raised by the serum between it and the original serous membrane, so as to produce bladders or cysts of various sizes and shapes. Sometimes they assume the form of large grapes; and in this case they are liable to be confounded with hydatids by poor observers and worse morbid anatomists. Occasionally, these sacs are so long, in proportion to their width, and so cylindrical, as to have the form of a tube, and to resemble a portion of intestine of extreme tenuity, terminating in a *cul-de-sac*. This production of false membrane in the form of cyst occurs most frequently in the peritoneum; but it is also seen in other serous membranes.

Presence of
detached
bodies.

Detached bodies are sometimes found in the cavity of a serous membrane. They are of various sizes and appearance, and differ in character as to the material of which they are composed; yet I believe that these varieties depend on the stage of their existence in which they come under observation, and on the transformations which they undergo. I believe they commence as an isolated clot of coagulable lymph; the smooth convex surface of which has contracted no adhesion, either to the serous surface, or to any other portion of false membrane. In process of time, the surface acquires a sufficiently membranous and firm.

consistence; and the detached body, instead of forming a clot of cheesy matter, contracts, losing its serous or watery part. If this take place rapidly, and materially reduce the size of the detached body, the surface exhibits an uneven or corrugated appearance. When of small size, they more often retain their smooth surface, and an increasingly firm structure, which becomes loaded with earthy matter, as I apprehend, by a process of endosmosis. These detached bodies may be seen, in the most recent state, wholly consisting of coagulable lymph, having a cellular character, infiltrated with serum, and presenting the size and figure of an egg-plum, somewhat flattened; but I have never seen them in the firm and advanced stage, which I have described, larger than a pea or a marble.

There is another form of the product of inflammation of the serous membranes, which I think can scarcely be referred to any of those before described. It is, from the first, more adherent to the serous surface than either the very recent membranous films, or the opaque, inorganizable flocculi. It has a firm and dense structure; does not become very, or even visibly vascular; and presents an uneven, unattached surface, towards the interior of the cavity. Sometimes it is scabrous, not unlike the papillæ on the tongue of an ox; at other times, it has a more reticulated, or honeycomb, appearance. If my observation is correct, it is generally accompanied by a good deal of fluid effusion; which, though not always clear, seldom, if ever, contains either membranous films or large opaque coagula.

It seems probable that inflammation may be set up at successive periods in different parts of the same serous membrane. Villermé is of this opinion; and adduces, in proof of it, the case of a man wounded by a bullet, in whom the pleura costalis was covered by a false membrane, already arrived at the commencement of the third stage, whilst a still more recent and pulpy one invested the pleura pulmonalis.

Scabrous
surface from
inflammation.

Inflammation
successively set
up in different
parts.

Spread of inflammation over a serous surface.

It has often been remarked, that when inflammation has attacked any of the serous surfaces, it has a strong tendency to spread and diffuse itself over them. We see this exemplified in the cure of hydrocele, by the introduction of a seton. It frequently happens, however, that the inflammation, although its limits are not defined, is far from extending itself over the whole surface. The characteristic disposition to spread is certainly most conspicuous where the inflammation is idiopathic; and the exceptions are most striking, where the inflammation has been set up by a purely local and mechanical cause. In these cases, we may frequently meet with the inflammation very much circumscribed: hence the mode of treating hydrocele, to which I have before alluded, is often unsuccessful. It would seem that the simultaneous injury of the opposed and corresponding parts of the serous membrane is favourable to the limitation of inflammation. Thus, if a patient have recovered from a penetrating wound of the thorax, by which both the pleura costalis and a corresponding spot of the pleura pulmonalis have been injured, you will very probably find the pleuritic adhesion confined to the immediate neighbourhood of the wound. Bichat had an opportunity of examining the body of an individual who had been affected with melancholy, under the influence of which he had, at different periods of his life, wounded himself with a knife twelve or fifteen times. In the most recent wounds, the intestines adhered to the parietes; in those which were somewhat older, they were connected by bridles; in a third class, which were of longer standing, the bridles were longer, and more slender; and in those which were the oldest, and of very long standing, the connexion was dissolved. You must, all of you, be aware of the very great danger which attends a wound of the dura mater; which, producing an opening into the cavity of the arachnoid, is extremely liable to lead to acute inflammation of that membrane, seldom affecting less than the

Causes which limit the spread of inflammation.

entire surface of one hemisphere, and often extending over both. Yet, if the injury have been still greater, and have affected not only the arachnoid lining the dura mater, but that which covers the brain, and have even produced the loss of a portion of that organ itself, it is by no means uncommon for the symptoms to be comparatively slight. The late Henry Cline, jun. used to lay considerable stress upon this fact, in conjunction with injuries of the head; and suggested the propriety of designedly lacerating the arachnoid and pia mater, in cases in which the dura mater alone has been wounded.

False membranes, at an early period of their organization, are tinged with yellow, in persons affected with jaundice. The serum which accompanies them is of the same colour, and tinges linen moistened with it; yet the serous membrane itself does not participate in this discoloration. This remark is confirmed by many authors. The strikingly yellow colour of the polished surface of the dura mater, which we see in persons who have died of jaundice, is probably only an apparent exception; since the yellow colour may be situated in the fibrous structure, rather than in the serous membrane which invests it.

False membranes distinguished in jaundice.

All the products of the inflammation of serous membranes, which are capable of becoming organized, have a strong tendency, after a time, to contract. Their new vessels contract with them; and many are either wholly obliterated, or become incapable of conveying red blood. Hence the new material, which once appeared of a bright-red colour, and highly vascular, subsequently becomes pale and blanched. It sometimes becomes not merely pale, but firm and dense, especially if not of the most plastic form; and this dense product of inflammation gives the character of induration, as an effect of that process.

Contraction and diminished vascularity of old false membranes.

Induration.

The formation of long bands and bridles, which may at first be thought to form exceptions to this rule, is in

fact perfectly subjected to it; since much more is lost in breadth, than is gained in length. And, as we have already seen, in the case related by Beclard, the bridles may be ultimately divided. We then have shreds of greater or less length, attached by one extremity only. Examples of this kind are, I think, most frequent in the pericardium.

Forms
which false
membranes
ultimately
assume :
1. Cellular.

2. Semi-
cartilagi-
nous.

When the effusion has been in small quantity, but extremely diffused, and of the most plastic quality, it ultimately becomes, as I have already repeatedly stated, a thin and loose cellular web; but I cannot agree with Villermé in thinking that adhesions, when once formed, become wholly removed in advanced age. He was led to form this conclusion from observing that there were no adhesions in the chests of several individuals who had lived to about the age of an hundred. When the effused organizable matter is in large quantity, and when, probably from the admixture of opaque flocculent particles, the inflammation has been protracted and chronic, the form ultimately assumed is dense and semicartilaginous. It is highly probable that the dense and semicartilaginous structure, which we meet with in these cases, is not wholly derived from the product of inflammation on the surface of the serous membrane, but is, in part, the thickening of the membrane itself to which the false membrane is intimately attached. Laennec considered that this form was favoured by the admixture of the red particles and fibrin of the blood with the product of inflammation; but I confess that I know of no facts which induce me to agree, on this point, with the high authority which I have just named. I am rather inclined to imagine, that when the inflammatory secretion in the serous membrane has an admixture of a mucous character, this addition will, if not too abundant, favour the production of a structure somewhat cartilaginous. The dense and cartilaginous products of inflammation occasionally become penetrated with earthy particles, and pass into a state more or less

approaching to ossification ; but this happens much more frequently beneath the attached surface of the serous membranes, than on the internal or secreting surface.

The contraction of the organized product of inflammation, to which I have already alluded, often gives rise to strange deformity of the parts to which they are united. Laennec was the first who pointed out the remarkable retrocession of one side of the chest which takes place when a patient survives and recovers from empyema. This he ascribed to the absorption of the fluid ; but, as I suggested to the Physical Society of this Hospital, in a Paper which I read on the application of the stethoscope, in the year 1822, I believe the true cause to be the contraction to which I have just alluded. I am confirmed in this opinion from having observed similar effects, where the cause, to which Laennec refers, could not have operated.

Consequences of the contraction of false membranes.

Before quitting the general notice of the effects of inflammation within the cavities of the serous membranes, I must notice the influence which pressure seems to exert in diminishing the amount of the fluid part of the inflammatory effusion. This is most strikingly seen in the case of the pleura. When inflammation of this membrane is associated with that of the substance of the lung, the latter does not collapse, as in cases of simple pleurisy ; and we find the quantity of the solid product of inflammation disproportioned to that of the serum ; in fact, the latter seems nearly or quite absent.

Effects of pressure, on effusion.

Besides the effects which I have now described as the results of inflammation on the secreting surfaces and in the shut cavities of the serous membranes, there are others, no less remarkable, which are to be observed on the attached surfaces.

Effects of inflammation on the attached surfaces of serous membranes.

In speaking of the changes which inflammation produces in this situation, I shall not attempt to examine the truth of the opinions maintained by Rudolphi, that the seat of inflammation is never in the serous membranes themselves,

but rather in the organs which they cover; that the serous membranes are no more susceptible of inflammation than the epidermis; and that pleurisy, pericarditis, and peritonitis, are, in fact, inflammations of the lungs, heart, and abdominal viscera. Chaussier and Ribes have professed a similar opinion regarding the so-called serous inflammations, as affections of the immediately subjacent cellular membrane.

The state of the parts which the serous membrane covers has unquestionably an influence on the tendency which the serous membrane has to inflammation. This is seen in emphysema of the lungs, which seems to be almost an insurance against pleuritis; but I know of no arguments of sufficient strength to prove that the serous membranes are lined by an inorganic layer analogous to the epidermis; and shall content myself with the fact, that the products of inflammation are sometimes found upon one surface, and sometimes upon the other, as sufficient to warrant the division which I have made.

Sub-serous
cellular
membrane.

The cellular structure, by which the serous membranes are connected with and attached to the organs which they invest, is by no means equally liable to the changes induced by inflammation, under all the serous membranes; nor even uniformly so, under every part of the same membrane. When the cellular membrane beneath the serous is loose and abundant, its proneness to inflammation is most considerable; and, on the contrary, when the serous membrane is closely attached to the subjacent parts, and has very little cellular tissue beneath it, it much more rarely happens that any morbid action takes place on the attached surface. The character of these changes is also very much modified by the peculiar structure of the part, as well as by the mode of inflammation.

Infiltration
of sub-se-
rous cellular
membrane.

One of the most common appearances of the kind of which I am now speaking, is, the serous infiltration of the cellular tissue. This is most frequently and remarkably seen, where the serous membrane is thin, and the cellular

structure beneath it particularly loose. Hence we have the best specimens of it in the arachnoid; and in the tunica vaginalis, about which the scrotum is well known to be swollen by effusion, after injection for the radical cure.

When the effusion is something more than mere serum, it exhibits varieties analogous to those which I described as presented by the effusion on the unattached and polished surface: that is to say, it is sometimes of a plastic and organizable character; in which case, it is often limited to a comparatively small part of the attached surface. At other times, it is somewhat puriform, and inorganizable; and though often more conspicuously remarkable in one part than another, it has no defined limits, and is generally accompanied by an extremely soft and lacerable state of the cellular structure which it infiltrates. This lacerability, however, by no means bears a necessary and relative proportion to the quantity and extent of the puriform effusion; since we sometimes see it, to a remarkable degree, accompanying the mode of inflammation of which I am speaking, when the effusion beneath the serous membrane is very trifling. The lacerability of the sub-serous cellular membrane, like the change which takes place in the vessels of the inflamed membrane, is the result of softening, as the direct effect of inflammation. I may notice, as offering specimens of the former or more plastic form of the product of inflammation, subjacent to a serous membrane, those partial inflammations of the pleura pulmonalis which we see accompanying inflammation, or tubercular deposit, in the substance of the lungs; and in which the adhesion to the pleura costalis is either very partial, or wholly wanting. We see it also in the abdomen, accompanying inflammation of the peritoneal coat of the liver, spleen, &c. The product of inflammation behind a serous membrane has, like that which is formed on its free surface, a strong disposition to contract, after it has become organized: hence it frequently gives rise to the puckering of the surface of the organ on which it is deposited.

Examples
of plastic in-
flammation.

Tendency to the production of bone on the attached surface.

It is probably one of the effects of the particular position in which it is situated, that the material deposited by inflammation beneath the serous membrane is far more prone to assume a firm and dense structure than that which is produced upon its secreting surface. This density, and the covering afforded by the serous membrane, are, I believe, the principal circumstances which favour the deposition of bony matter beneath the serous membranes, in which situation it is by no means rare to find plates of this substance. The consideration of this curious fact would lead me into the subject of the formation of bone, and more particularly of its accidental production; which, as it would occasion too long a digression from the subject more immediately before us, must be reserved for a future opportunity.

Examples of non-plastic inflammation.

The opposite state, in which the effusion is more or less puriform and widely diffused, and the cellular structure very lacerable, is found in conjunction with the turbid, puriform, and little organizable effusion into the cavity of the serous membrane: hence we find it in cases of puerperal peritonitis. Dalmas jun., who has written especially upon the affections of the cellular structure, subjacent to the serous and mucous membranes, attributes this condition of the subperitoneal cellular tissue, in puerperal peritonitis, to the distension and elongation of the cellular membrane occasioned by the developement of the gravid uterus. Yet the occurrence of the same thing, in connection with the same form of peritonitis in males, proves that this distension, though it may assist as a predisposing cause, is by no means an essential condition. The best examples of this form of inflammation in males may be seen in peritonitis following stricture and other diseases of the urinary organs, lithotomy, and accidental injuries of the abdomen.

Primitive affection of the sub-serous cellular tissue.

The sub-serous cellular membrane is not merely the seat of morbid actions propagated to it from the serous surface which covers it. It is itself liable to be primitively affected. It affords the bed in which commence those adventitious deposits which have been described as steatomatous, scrofu-

lous, cancerous, fungoid, and melanoid tumors and tubercles of the different serous membranes. Hydatids are likewise found in this structure.

Gangrene is an extremely rare termination of inflammation in any of the serous membranes, especially of idiopathic inflammation. Lieutaud has mentioned one instance in the pericardium; and the highly offensive and discoloured condition of effusions into some of the serous cavities, described by Bichat, was probably attended with a state of membrane approaching to sphacelus. I cannot say that I have ever seen an unequivocal instance of gangrene of a serous membrane, except when it was either propagated from the adjoining structures, or the effect of accidental injury. We have an example of the first of these, in gangrene of the lung; and of the second, in strangulated hernia. It is by no means uncommon to find both the serous membranes, and the false membranes formed upon them, of a very dark colour; but this is of a different nature from gangrene, and is to be carefully distinguished from it. It depends on an altered condition of the blood in the minute vessels; and is apparently most frequent in situations in which inflammation or irritation had at one time existed, but had subsequently subsided. Or it may even be decidedly cadaveric; and depend on altered blood, either in its vessels, or extravasated, or transuded.

Gangrene
of serous
membranes.

The morbid appearances connected with the serous membranes, and referrible to scrofula or struma, are not confined to the production of distinct collections of a scrofulous deposit in the cellular membrane on the attached surface of the serous. Besides these isolated collections, we meet with other phænomena, both on the unattached surface and in the membrane itself. On the smooth, unattached surface, collections of tuberculous or scrofulous matter, varying in size, number, and figure, are sometimes found dispersed through the substance of recent false membranes, the production of ordinary inflammation. There are

Effects of
scrofula on
the serous
membranes.

other cases in which the whole of the adventitious deposit is so modified by the strumous diathesis, that, instead of the ordinary false membrane, we meet with a material known by the name of tuberculous, in the sense in which this word is used to designate the character of the material rather than its particular form. As I shall hereafter have occasion to call your attention especially to the consideration of tuberculous matter in the sense in which the term is here employed, I shall not discuss the subject on the present occasion, farther than to observe, that in an early stage of this deposit upon the unattached surface of a serous membrane it forms a concrete layer, possessing some degree of translucence, but wanting the lamellar form of the plastic product of inflammation, and rather exhibiting a peculiar shortness and friability. At a later stage, instead of a semitranslucent layer, we find an opaque substance, presenting some shade of yellowish white; in fact, assuming the character of what is called crude tuberculous matter, and generally coincident with other varieties of this deposit in other parts of the body.

From the thinness, as well as firmness of the different serous membranes, we could scarcely expect to find tubercles or other deposits developed to any considerable extent in their very substance. We nevertheless occasionally meet with examples of what are termed miliary tubercles, in this situation.

Malignant
disease.

The different varieties of malignant disease, when they attack the serous membranes, are almost exclusively confined to the sub-serous cellular membrane already noted as forming the nidus for their developement; yet we may occasionally find minute bodies, having the character of schirrus in the substance of serous membranes, in individuals who are known to be contaminated with malignant disease. It is a very rare occurrence to meet with any thing bearing the character of malignant disease upon the unattached surface of a serous membrane; since, when the

presence of these diseases upon the attached surface has induced any derangement on the free surface, this generally assumes the character of ordinary inflammation. I have however, in very rare cases, met with appearances which I regarded as allied to fungoid disease upon the unattached surface of the peritoneum. Melanosis is described as affecting the surface of the serous membranes; but I believe that there is a fallacy in this respect, similar to that which I noticed, when speaking of the gangrene of the serous membranes. I shall advert to this subject on a future occasion.

Hydatids may occasionally be found in the cavity of serous membranes; but, in such situations, their presence can only be regarded as accidental, and consequent on their escape from the seat of their production, which, in the majority of cases, is the sub-serous cellular membrane. In this situation they frequently give rise to tumors of enormous size, and possessing sufficient interest to claim attention in a future Lecture.

The common effect of local injury to a serous membrane is the production of inflammation; but as I have already noticed several of the peculiarities of traumatic inflammation of the serous membranes, I have nothing further to add on this subject at present; except the observation, that wounds penetrating these cavities are apt to develope a form of inflammation characterized by the want of plasticity of the product; and to this circumstance I am inclined to refer some of the conclusions at which those have arrived who have investigated the subject by means of experiments in which traumatic inflammation was induced.

Bichat has remarked, that it is rare for one serous membrane to communicate its inflammation to another. It is certainly true, that we frequently find the traces of extensive and long-standing pleuritis without any appearance of inflammation, either of the pericardium or peritoneum. We may also have extensive peritonitis, without either the

Hydatids.

Local injury.

Sympathy between serous membranes.

pleura, the pericardium, or the tunica vaginalis being at all affected. At the same time, Bichat's rule is by no means free from exception. There are probably few persons who have had extensive opportunities for witnessing inspections, who have not observed how often the traces of inflammation, either old or recent, exist, concurrently, at the base of the right lung, and on the convex surface of the liver. The same thing is observable, though less frequently, with respect to the left pleura, and the peritoneum in the neighbourhood of the spleen.

Connection
between
rheumatism
and inflam-
mation.

Although the serous membranes may be prevented from communicating their morbid actions to each other, by a want of continuity of tissue, and in some instances by a want of contiguity, they are nevertheless linked together, by an inexplicable, but indubitable sympathy. Hence, either the morbid affection which has been excited on one, may be propagated to another; or the same general exciting cause may act on two, or more, simultaneously, with sufficient force to induce disease. You must all be well aware how often it happens, that, in rheumatism, the inflammation of the synovial membrane is followed by pericarditis. At other times it is the pleura, as I have myself witnessed, which is thus affected. My friend Dr. Foville has informed me, that he has seen rheumatism of the joints subside on the sudden production of hydrocele; and, *vice versa*, the cure of hydrocele succeeded by the appearance of rheumatism.

Connection
between Dr.
Bright's
kidney and
serous in-
flammation.

There is a particular derangement of the structure of the kidneys ably described by Dr. Bright, who first particularly pointed it out. In conjunction with this state of the kidneys, there is frequently (as he has shewn) a disposition to inflammation pervading the serous membranes in general. It is probable, that this is, in part, attributable to the hydropic effusion, to which this state of kidney predisposes, becoming an irritating cause.

A proof of the morbid sympathy existing between the

serous membranes may also be seen when they are affected with cancerous or fungoid tubercles. When growths of this kind have been formed about the peritoneum—which, of all the serous membranes, is the most liable to them—you will not unfrequently find a sprinkling of the same kind about the pleura, and, more rarely, about the pericardium.

These conclude the remarks which I have thought it necessary to offer respecting the serous membranes generally; and in the ensuing Lectures I shall solicit your attention to the morbid appearances of some of these membranes in particular. In doing so, I shall not merely be bringing forward the proofs and illustrations of the principles which I have endeavoured to unfold, but I shall also have occasion to point out various modifications and peculiarities presented by each. Conclusion.

LECTURE III.

ON THE SEROUS MEMBRANES.

THE ARACHNOID.

DEFICIENCY OF ARACHNOID—EXCESS.—ALTERED SECRETIONS—RESULTS OF INFLAMMATION—DIVISION OF THE ARACHNOID INTO FOUR PORTIONS—ARRANGEMENT ADOPTED BY DR. FOVILLE: 1. THE ARACHNOID EXTERNAL TO THE BRAIN—RARITY OF INFLAMMATORY EFFUSION WITHIN THE CAVITY IN IDIOPATHIC ARACHNITIS—EFFUSION WITHIN THE CAVITY MORE FREQUENT AS A RESULT OF INJURY.—PRODUCTS OF INFLAMMATION BETWEEN ARACHNOID AND PIA MATER—DR. FOVILLE'S DESCRIPTION OF THE APPEARANCES FOUND AFTER MENINGITIS—OPACITY, THICKENING, AND INCREASED FIRMNESS OF ARACHNOID—EFFUSION OF SERUM—FUNGOID TUMORS IN THE PIA MATER—APPEARANCES ON DURA-MATRAL SURFACE. 2. ARACHNOID OF THE VENTRICLES—SEROUS EFFUSION, AND ACCOMPANYING CHANGE OF MEMBRANE—COAGULATING LYMPH RARELY SEEN ON THE VENTRICULAR ARACHNOID—SCABROUS APPEARANCE. 3. ARACHNOID OF THE PLEXUS CHOROIDES—WANT OF CHARACTERISTIC APPEARANCES ON ITS FREE SURFACE—CYSTIFORM APPEARANCE OF SEROUS EFFUSION—OCCURRENCE OF INFLAMMATORY DEPOSIT AT PARTICULAR POINTS OF THE CHOROID PLEXUS—EXPLANATION OF THIS PHENOMENON—ANÆMIA OF THE CHOROID PLEXUS.—VELUM INTERPOSITUM.—MORBID APPEARANCES OF CEREBRAL ARACHNOID NOT REFERRIABLE TO INFLAMMATION—HÆMORRHAGE, SPONTANEOUS OR TRAUMATIC—ARGUMENTS TO SHEW THAT THE DURA MATER HAS A LINING SEROUS MEMBRANE—RESULTS OF SCROFULA AND MALIGNANT DISEASE. 4. ARACHNOID OF THE SPINAL CHORD.—RESEARCHES OF DR. SHARPEY—DEFICIENCY AND EXCESS—LESIONS OF SECRETION—EFFECTS OF RECENT INFLAMMATION—EFFECTS OF ANCIENT OR CHRONIC INFLAMMATION—THICKENING AND CONTRACTION OF THE SPINAL ARACHNOID—ATTACHED SURFACE—CARTILAGINOUS AND OSSIFIC PATCHES ON ARACHNOID.

GENTLEMEN,

YOUR attention has hitherto been directed to the morbid phænomena which are common to the serous membranes as a class; but there are circumstances which render it necessary to consider each membrane separately. Any one of the serous membranes may exhibit all the appearances described in my last Lecture; but you will find that each of these mem-

branes is, in some measure, individualized by the frequency or rarity with which it exemplifies certain conditions. I shall first bring under your notice the morbid anatomy of the arachnoid, which presents several remarkable peculiarities.

A deficiency of this membrane, either total or partial, is a rare occurrence. The former is, of course, met with in conjunction with absence of the brain in acephalous fœtuses. The latter may occur where there is deficiency of part of the brain, or irregularity in the ventricles; or where the falx is wholly or partially wanting. Deficiency.

An excess of arachnoid is rather less uncommon than a deficiency. We have examples of it in hernia cerebri; in which it sometimes happens, that not only the arachnoid covering the surface, but the portion also within the ventricles, is prolonged into the protrusion. Excess.

The variations with respect to the secretions of this membrane consist in their being sometimes extremely scanty, leaving the surface of the brain almost dry; or, on the other hand, in the more frequent, and, as it would appear, the more serious affection of a morbid increase, constituting hydrocephalus; which, however, seldom takes place, except as a result of inflammation. The serum may also be tinged with bile or blood; and there are other alterations in this secretion, which are the results of an inflammatory process, and will be noticed in their proper place. Altered secretions.

In describing the results of inflammation of the arachnoid, it will be most convenient and correct to treat of the different portions of this membrane separately. I shall therefore consider the arachnoid as consisting of four portions: of which, the first comprises that which is external to the brain; the second, that which lines the ventricles; the third, the portion which belongs to the plexus choroides; and the fourth, that of the spinal cord. Dr. Foville, whose researches respecting the brain justly entitle him to be placed in the first rank of cerebral anatomists and patho- Results of inflammation.

Division of the arachnoid into four portions.

Arrangement adopted by Dr. Foville.

logists, in his article 'Meningites,' in the *Dictionnaire de Médecine et de Chirurgie pratiques*, treats of the inflammation of the arachnoid in a different order. He considers, first, inflammation of the parietal arachnoid which concerns that part of the arachnoid which lines the dura mater; and which he connects with the inflammation of that membrane, and of the intervening cellular tissue. Under the simple designation, Arachnitis, he places those cases in which the product of inflammation is found between the smooth surfaces of the arachnoid, lining the dura mater, and that covering the pia mater; that is to say, in the cavity of the arachnoid. The third division he calls Cerebral Meningitis. It comprises those cases in which the product of inflammation is found infiltrating the pia mater, and to which the name Piitis has been given by some pathologists; and also those, in which the inflammatory effusion is found within the ventricles. This division of the subject is excellent and practical, from its conformity with the different assemblage of symptoms met with during the progress of the disease, according as one or other of the portions referred to is the seat of inflammation. I prefer, however, retaining the arrangement which I had adopted long before that article was written; not only as more accordant with the plan adopted with regard to other serous membranes, but as affording equal or greater facilities for the description of the appearances which I have to review.

THE ARACHNOID EXTERNAL TO THE BRAIN.

The product of the inflammation of this part of the arachnoid is much more frequently purely serous than that which results from the inflammation of the other serous membranes. Whilst, in most of these, the inflammatory effusion is generally found within their close sacs, in the arachnoid it is extremely rare to meet with the effusion, whatever may be its character, between that portion which lines the dura mater, and that which is next to the pia mater, and covers

Inflammatory effusion rare within the cavity of the arachnoid;

see Audral
iniquie. P. 40*

the surface of the brain. Villermé says, he has never seen an instance of the kind.

The occurrence of the product of inflammation, whether false membrane or puriform effusion, between the polished surfaces of the arachnoid, is more especially rare in those cases of arachnitis which are not traumatic; yet we both infer, from analogy, that such a deposit may take place without being the result of external injury; and we have also authority for stating, that it has actually been observed. I had myself long been fruitlessly seeking for an example, not traumatic, of this form of arachnitis, when a case of the kind presented itself. A young man, aged 23, had, for several months, been labouring under lumbar abscess. He never manifested any symptoms of affection of the head, until between four and five hours before the time of death. On inspection, besides other very interesting appearances, which it is needless here to describe, small but sufficiently evident and unequivocal recent adhesions were found between the arachnoid covering the dura mater, and that covering the pia mater. The far greater part of the effusion was, however, in the usual situation, beneath the arachnoid covering the pia mater: it was of a light yellow colour, and of a thin puriform consistence. It must not however be concealed, that, even in this case, the arachnitis appeared to depend on a local cause, which, though at a distance from the head, was nevertheless in a part most intimately connected with it. The lumbar abscess had formed a communication with the spinal canal through the foramina of conjugation by which the nerves pass out. It was indeed suspected that the puriform fluid found in the spinal canal, and within the cranium, had been derived from the lumbar abscess, and not from the inflammation of the cerebro-spinal membrane. I am however more inclined to believe, that though some of the fluid in the spinal canal may have been derived from the abscess, the principal effect of the communication had been to excite a general arachnitis.

especially in
idiopathic
affections.

see Abercrom-
bie. P. 57.
Andral Clinique
P. 10.

Case of
membra-
nous effu-
sion within
the sac.

The adhesions which I have mentioned—the presence of the fluid on both sides of the membrane— and the recollection of a very similar case of arachnitis from injury of the spine, but without any accompanying abscess, lead me to the opinion which I have stated.

Similar case
cited from
Rostan.

Another example of the product of the inflammation of the arachnoid occurring between its two polished surfaces is recorded by Rostan. In a patient who died in the Salpêtrière, at the age of 64, who was originally rachitic, and who had twice been attacked with apoplexy, the last seizure of which took place eleven days before her death, a layer of puriform and albuminous matter, differing from half a line to a line in thickness, was found covering the surface of the arachnoid lining the dura mater in both of the temporal fossæ, and in the anterior and lateral part of the right hemisphere. It is expressly stated, that this layer had all the characters which belong to those found on the internal surface of the pleura.

Cases re-
corded by
Dr. Foville.

Dr. Foville, in the article to which I have before alluded, gives the result of six cases, in which the product of inflammation existed within the cavity of the arachnoid. Two considerable layers of false membrane extended over the whole of the internal surface of the arachnoid lining the dura mater and the external surface of that covering the brain, and were applied to these two surfaces; to which they were so slightly attached, as to admit of ready separation from them. They presented a considerable and uniform thickness, a good degree of firmness, and were of a yellow colour. There were but slight and partial adhesions between their opposed surfaces. There were thus four distinct membranous layers external to the brain: 1. The dura mater, with its serous lining; 2. The layer of false membrane corresponding to it; 3. A similar layer corresponding to the surface of the arachnoid investing the brain; and, 4. This portion of the arachnoid with the pia mater. The striking resemblance observable between all

these cases induces Dr. Foville to believe that there is a special tendency to produce this form, whenever inflammation extensively affects the free surface of arachnoid. The distinctness and uniform diffusion of the two layers of false membrane he thinks attributable to the movements of the brain; and he points out the analogy to some cases of pericarditis, in which a similar disposition occurs. In all these cases of arachnitis, there was some effusion between the two layers of false membrane. In some, it was of moderate quantity, and in others more considerable. In the last case which the Doctor has met with, a considerable quantity of blood had been effused, which caused the patient's death. All these cases had commenced by an acute cerebral attack; which, in one instance, occurring in an old soldier, had been caused by a violent blow on the head. In the other instances he had not been able to ascertain the cause. There was a similarity in the symptoms presented before death in all these cases, in several of which they had existed for years. They exhibited a state of the most complete stupidity, accompanied by an apparent paralysis of nearly all the organs of sense. The patients actually resembled statues; with this difference, that when pushed, they walked; when set upright, they kept their balance; and when food was put into their mouths, they swallowed it. Their eyes, eyebrows, and other parts of the face, remained perfectly motionless. The sensibility of their skin appeared mechanical; for if a limb were pinched, they would withdraw it, but without any other evidence of suffering.

13 Films of false membrane, the result of inflammation, have been repeatedly observed, by Dr. Guersent and Dr. Foville, in the temporal fossæ, and other parts at the base of the brain in children. Dr. Foville appears to have repeatedly met with very thin and partial false membranes about the crura cerebri and the pons Varolii; and he does not limit this observation to children.

Dr. Foville's observations of false membranes in the arachnoids of children.

A puriform secretion on the smooth surface of the

arachnoid is much less rarely met with, as a consequence of injury. Two cases of this kind are related in the fifty-first epistle of Morgagni; and I could easily have cited others from different authors, had I thought it necessary; but it is needless to go further than our own wards.

Case of
traumatic
arachnitis
with puru-
lent effu-
sion.

A lad of eleven years of age was brought into Accident Ward, under the care of John Morgan; having received a severe injury of the head, by contusion between two carriages. He survived the accident about two days. There was considerable injury to the scalp, and fracture with depression of the bone; for which he was trephined, with immediate, but partial and temporary relief. On the right side, that on which the fracture had taken place, there was found, after death, a large quantity of thin pus, or puriform fluid, between the arachnoid lining the dura mater, and that covering the brain. On the left side there was a small quantity of pus beneath the arachnoid. A similar case occurred in the same ward, in an adult, a patient of Charles A. Key.

Adhesions between the two surfaces of the arachnoid are of course extremely rare. We nevertheless sometimes meet with them, but chiefly when there has been some persisting local cause of irritation and pressure, as, *e. g.*, after injuries of the head, and in conjunction with fungoid and other tumors.

Morbid
anatomy of
acute me-
ningitis.

Appearances, the result of inflammation on the attached surface of the arachnoid, especially on that which is in contact with the pia mater, are as frequent as we know that they are rare on the polished surface. It is in this situation that we are accustomed to look for, and find, pathological appearances, in those cases of acute disease which are marked by a high degree of fever, by pain of head, delirium, convulsions, and often, ultimately, by coma; symptoms which, in children, are recognised as indicative of acute hydrocephalus; and, in adults, of brain-fever, phrenitis, or rather meningitis, if the practitioner be acquainted with modern pathology. It may excite surprise that

inflammation of the membrane covering the brain should thus appear the principal cause of the disturbance of the intellectual faculties; since the brain, and not its membranes, must be regarded as the structure in the nearest relation to those faculties. But it is obvious that the cellular structure of the arachnoid covering the brain, or, in other words, the pia mater, owes its notoriously high degree of vascularity to the multitude of vessels which ramify through it in their course to the surface of the cortical substance of the brain, and which do not enter that organ until most minutely subdivided. Now the researches of Drs. Foville and Delaye have pointed out the cortical substance of the brain as the part of the organ most closely connected with the intellect. It is therefore perfectly reasonable that the form of arachnitis which we are now considering, should be accompanied with some disturbance of this part of the brain, and consequently be marked by the symptoms enumerated. It is more surprising, that, in some instances, the effect produced on the mental faculties is so slight, as scarcely to be perceived.

Though, after the most active symptoms of arachnitis, we often find nothing but serum infiltrated behind the arachnoid, we at times meet with a coagulable effusion, and, rather more frequently, with one that is puriform. Rostan has given several cases of puriform effusion beneath the arachnoid, in cases of idiopathic arachnitis. Other cases are given by Cruveilhier; and I have also repeatedly met with the same thing. Some of these examples are recorded and figured in Dr. Bright's splendid work.

Products
of inflam-
mation
between
arachnoid
and pia
mater.

When the product of inflammation beneath the arachnoid covering the brain assumes a puriform appearance, it frequently has a greenish hue, which in some instances is so strongly marked as to constitute a leek green. When the effusion infiltrated in the pia mater is only partial, it is nearly or quite confined to the sulci between the convolutions, and more especially to the course of the large vessels, where it forms an irregular line at each side of them. It

may therefore be supposed that it is in these situations that the change from the serous to the puriform character commences. The presence of the vessels, as well as the greater thickness of the pia mater, may be concerned in producing this effect.

*chronic disease
Pia M. arachnoid*
69
Dr. Foville's description of meningitis.

Dr. Foville's description of the anatomical characters of this form of arachnitis, which, as has been already stated, is designated by him cerebral meningitis, is so good, accurate, and concise, that I cannot do better than give it, as nearly as possible, in his own words. "The anatomical characters of meningitis are furnished," as he observes, "by the pia mater, by the arachnoid, and by the surface of the brain. The earliest stage is characterized by the delicate injection of the most minute vessels of the pia mater. The injection is so general, that it causes the external surfaces of the brain to appear of an extremely bright red, after a few minutes' exposure to the air. The transparent serum naturally pervading the pia mater has become very scanty, and in some cases appears to be wholly wanting. The free surface of the arachnoid has neither the polish nor the moisture which it presents in its healthy state, but is slightly viscid, and sometimes dry and dull: the membranes are very readily torn, and are therefore detached in small fragments, which makes it tedious and difficult to separate them from the brain. The surface of the brain is manifestly reddened, minutely injected, and sometimes swollen in a remarkable manner. The redness is rendered most conspicuous when very thin slices are cut from the surface. There is sometimes such a deficiency of moisture in the brain, that the membranes appear to adhere to it; yet a little attention will convince us that this appearance is deceptive, and that it simply depends on the viscosity of the brain to which they are applied at those spots on which they are the most firmly pressed together. Such are the appearances observed in those rare cases in which death has quickly carried off the patient in the first period of acute

meningitis." In the later stages, the injection of the pia mater continues, but the fluid beneath the arachnoid, becoming of a milky colour, and of a greater density, presents the puriform character with the appearances which I have before described. The Doctor points out the fissure of Silvius as the part at which the puriform character is most frequently met with. The first stage which the Doctor has described must in some instances be of brief duration; since, after a very short illness, well-marked puriform effusion may be found beneath the arachnoid.

In a patient who died in this hospital, affected with arachnitis, which supervened on an accident by which he received a slight wound of the occiput and a more severe injury to the cervical vertebræ, we found beneath the arachnoid a considerable quantity of yellow serum, and some soft coagulable matter in the form of a thin and recent false membrane. In this, as in almost every case of arachnitis, the membrane had partially lost its transparency, and appeared to be somewhat thickened. Opinions are divided with respect to the nature of this opacity of the arachnoid; some persons regarding it as the result of maceration in the effusion, whilst others hold it to be a more direct effect of inflammation. Both opinions are probably founded in fact; but I am inclined to think that the latter is more generally the correct one. I believe it to be often one of the traces of an arachnitis of an old date or chronic character. I have observed such opacity to be most considerable in that part of the arachnoid which corresponded with the sulci between the convolutions of the brain; and in that situation I have seen the thickening of the arachnoid assume a mottled or minutely spotted appearance.

As another result and evidence of a long-past or chronic arachnitis, may be mentioned the increased thickness and firmness of the arachnoid and pia mater conjointly, in which state they may be separated in large portions from the convolutions of the brain: it must however be observed, that

Opacity of
arachnoid.

*see Bright.
Med. Rep:*

Increased
thickness
and firm-
ness of
arachnoid.

this easy separation is not always solely ascribable to the cause just alluded to, since it may be promoted by the abundance of serum infiltrating the pia mater, or by the state of the surface of the brain itself; as, for example, in those cases in which it is the subject of atrophy. Thickening of the arachnoid and pia mater, carried to a considerable extent, is most frequent at the base of the brain, about the medulla oblongata, pons Varolii, and pons Tarini, where the arachnoid is sometimes seen almost resembling parchment. In some of the situations just mentioned, the thickening of the arachnoid and pia mater is so far from being readily separated from the subjacent brain, that it is with more than usual firmness attached to it.

We always, I believe, find some opacity of the arachnoid and small particles of opaque white substance upon the arachnoid covering the pia mater in the immediate vicinity of the longitudinal sinus. This, in general, is not to be regarded as a morbid appearance; but, when the white opaque substance is in much larger quantity than usual, and accompanied with greater and more extensive opacity of the membrane, I feel disposed to attribute it to chronic or ancient inflammation; and some cases, which I have met with, tend to confirm this idea.

Collections
of serum be-
neath the
arachnoid.

A large quantity of serum is sometimes found beneath the arachnoid covering the brain, in cases in which, if inflammation had been the cause, it must have been of a very chronic character. The fluid may be found collected at a particular part, and the form of the brain may be greatly modified by its presence. In one case which I saw in the Salpêtrière, several ounces of serum were collected beneath the arachnoid, covering the anterior lobes of both hemispheres. The external form of the forehead in this subject was remarkably fine, whilst the brain, from the cause just assigned, was miserably deficient at the anterior part.

Ossific
deposit.

It is an extremely rare occurrence for bony matter to be found beneath the arachnoid investing the brain. Dr.

Bright. 126
size of barley
in the arachnoid
to the base part of head
ing in the direction of a vessel.

the same
appearance
in Spinal
arachnoid

Baillie has mentioned one example on the authority of Soemmering; and we have one specimen in our collection, in which a few small particles of bony matter were found in this situation.

Fungoid tumors are sometimes formed in the pia mater. I have seen them of about the size of a cob-nut, producing a corresponding depression upon the surface of the brain, which did not appear in other respects affected. In other cases, the substance of the brain has participated in the disease.

Fungoid tumors.

Bright
x

The extremely close and intimate connection between that portion of the arachnoid which lines the dura mater and this latter membrane is unfavourable to inflammation exhibiting its effects beneath this division of the arachnoid.

adhesive
Hope. Fig. 260.
Recent inflammation of dura-matral arachnoid.

The effect of recent inflammation is rarely seen in this situation. Injuries of the head are among the causes most likely to induce it; but independently of such exciting causes, Dr. Foville mentions partial and irregularly circumscribed elevations of this part of the arachnoid, sensible both to the eye and to the finger, and accompanied by a brownish or yellowish-red hue. When a portion of dura mater and arachnoid exhibiting this state is detached from the calvaria, and pressed between the thumb and finger, as they are made to move upon each other the two membranes are found to separate readily in consequence of the altered state of the cellular membrane between them, which, in fact, is the structure chiefly affected. Bichat mentions a case of chronic inflammation of this part of the arachnoid, in which the membrane was sensibly thickened, and very easily detached from the dura mater. X

Tumors of
See Hope's
Fig. 259.

Deposits behind this portion of the arachnoid afford the most striking instances of that disposition to ossification behind serous membranes to which I have already alluded. Ossific patches of this kind are, perhaps, the most frequently met with upon the falx; but they are often found between the arachnoid and the dura mater, lining the cranium. The

Ossific patches between arachnoid and dura mater.

*In Les exhibited to the Path. Soc. Dublin, a preparation showing a
thickened state of the Dura-matral arachnoid and the Pia Mater
during the left hemisphere was affected with similar deposit there was
effusion in the ventricles - & tubercles in the base of brain.*

most extensive specimen of this kind, which I have met with, was taken from the head of an old man, who, from his infancy, had been subject to hydrocephalus.

ARACHNOID OF THE VENTRICLES.

Aberechombie I have next to mention the membrane lining the ventricles of the brain. This membrane has, since the time of Bichat, been regarded as a prolongation of the arachnoid. The present is not the place for going into its anatomical relations; but whether they have been correctly given or not, it is certain that this portion of arachnoid presents peculiarities which entitle it to separate notice.

Whilst on the external surface of the brain we find the arachnoid distinctly separated from the organ by the loose cellular structure of the pia mater, and the two membranes to all appearance only partially attached to the substance of the organ by the vessels which they transmit to it, in the ventricles the lining membrane is seen to be so inseparably united to the surface which it invests, that its existence as a distinct membrane sometimes cannot be demonstrated without special precautions. This membrane may be the seat of either acute or chronic inflammation. In both of these states, there is often a copious effusion of a purely serous character, constituting either acute or chronic hydrocephalus internus, in the same manner that the serous effusion under the arachnoid covering the convolutions constitutes hydrocephalus externus. This is the most frequent effect of arachnitis affecting that part which lines the ventricles; and in conjunction with this effusion, the membrane becomes thickened, semi-transparent, pulpy, and sometimes sprinkled with minute spots of blood. When this form of inflammation has passed into the chronic state, the increased firmness, as well as thickness of the membrane, becomes very evident. It is extremely rare to find flakes of recent lymph accompanying the inflammatory effusion within the ventricles of the brain; but as we occasionally

Serous effusion in the ventricles.

Changed character of membrane accompanying serous effusion.

Coagulating lymph rarely met with.

591^x
in Deal's
Chiniquet
Bright.

right 26.28;
yes.

meet with old adhesions between the opposite surfaces of the ventricles, it is possible that such flakes may be formed to a trifling extent. The adhesions of this kind have been principally found between the corpus striatum and the opposite side of the ventricle. *B.*

The inflammatory effusion within the ventricles is sometimes met with of the non-plastic character, when it assumes the appearance of a thin sero-purulent fluid. *Bright. P. 12. 14.*

The surface of the membrane lining the ventricles is occasionally sprinkled with very minute and tolerably firm elevations, as if it had been sprinkled with a small quantity of finely-powdered glass. This appearance may be regarded as an instance of the scabrous form of inflammation of the serous membranes, which I have already described. The small yellow particles which are occasionally met with, and are chiefly situated on ridges—as, for example, upon the peduncles of the pineal gland, and on the anterior commissure—have probably a close alliance to the scabrous elevation which I have last noticed.

ARACHNOID OF THE PLEXUS CHOROIDES.

I am not aware that this part of the arachnoid is ever absent, when the brain and its ventricles have existed; nor is it apt to deviate from its normal state, in being either too small or too large, except that it sometimes becomes distended, in consequence of preternatural deposits within it. The product of its inflammation on the free surface necessarily becomes mixed with the secretion of the arachnoid lining the ventricles. It is consequently impossible to state what are its peculiarities, if it possess any. I shall therefore confine my remarks to appearances on the attached surface, that is to say, in the substance of the plexus choroides.

From the abundance and size of the vessels in the plexus, it might be supposed that this part would, under inflammation, give rise to a copious effusion: we do not, however, find this to be the case on the attached, whatever may

Inorganizable effusion
sometimes seen. *Andral, Clin. Page 58.*

Surface of the ventricular arachnoid sometimes scabrous. *Bright. P. 303. 377. 62. Andral, Clin. case 18. Bright 37.*

Tumor of the Brain. Bright. P. 121. P.

No marked character on the free surface.

No evidence of much effusion from the choroidal arachnoid.

occur on the free surface. This result is probably attributable to the circumstance, that the vessels of the plexus are rather in the condition of vessels *in transitu* to other parts, than of those constituting an organ in which the blood is elaborated for a particular purpose, as in glandular, muscular, and some other structures. When serous effusion takes place in the substance of the plexus choroides, it is generally collected into small cysts, which give to the plexus an appearance like that of a bunch of currants. They vary in dimension, from the size of a millet-seed, to that of a sphere of about one-third of an inch in diameter. They rarely exceed this size; but Dr. Hooper, in his work on the morbid anatomy of the brain, has figured a case in which cysts of this kind are about two inches in diameter. Of the symptoms occasioned by those bodies I am not prepared to speak; but the presence of smaller cysts, and of other morbid appearances of the plexus choroides, which I shall presently notice, has generally concurred with such symptoms of cerebral disturbance as the state of the plexus choroides can have had little, if any, influence in producing.

Cysts in the
choroid
plexus.

See from 71c. 3/5. X

Opaque
spots in the
plexus.

See 90b.

The plexus choroides occasionally exhibits numerous opaque whitish points, diffused through the whole length of the plexus. It is, however, more common to find the product of inflammation collected at a particular spot, which is almost always near to the commencement of the descending cornu. In several cases, it has occurred on both sides, collected in a well-defined body of the size of a barberry, or even as large as a horse-bean, of a yellowish white colour, sometimes soft, and sometimes of a firm consistence. These bodies are liable to become loaded with earthy matter, which gives them more the character of petrification than of positive bone. The occurrence of these deposits, exclusively, as it would appear, at one part, cannot be accidental, but must depend upon some cause inherent in the part; and I have imagined that this cause might be the

turn which the plexus takes to reach the descending cornu; in making which turn, if the plexus be subjected to any motion, a slight degree of friction may take place. It has never occurred to me to meet with other deposits in the plexus choroides than those of which I have just spoken.

The plexus choroides is sometimes extremely exsanguineous and pale. I have been surprised to find this state repeatedly occurring in cases in which there had been a remarkable degree of cerebral excitement; and the idea has suggested itself, that the turgescence of other parts within the cranium may have prevented the vessels of the plexus from receiving the blood as usual.

Anæmia of the choroid plexus frequent after delirium.

The *velum interpositum*, a portion of plexus choroides beneath the fornix, has not often been noticed as the seat of morbid appearances. In some cases of arachnitis, I have seen this portion of membrane sprinkled with minute miliary tubercles, which appeared to be of a scrofulous character. It is by no means uncommon to regard the hydrocephalus of children as a scrofulous affection; but I must confess, that, except where the exciting cause has been the deposition of tubercular matter in the brain, it is rare to find anatomical evidence of scrofula in hydrocephalic heads, although there can be no doubt that the constitution denominated 'strumous' is that which is most disposed to this affection.

Velum interpositum.

I shall now conclude my remarks on the subject of the cerebral arachnoid, by noticing two or three morbid appearances connected with this membrane, and not usually referred to inflammation as their cause.

The first of these is the effusion of blood, which may either take place spontaneously, or from violence. From either of these causes it may be found, in any of those situations which I have described as occasionally occupied by the serous or puriform products of inflammation; that is to say, either upon its polished, unattached surface; or beneath that part which covers the pia mater;

Hæmorrhage into or beneath the arachnoid, from disease or accident.

or within the ventricles. It is needless that I should attempt to offer a minute description of the appearances which these effusions present; yet I may remark, that they are often comparatively limited in their extent, rather than diffused, from the point at which the eruption has taken place, into situations to which we might have been tempted to conceive, *à priori*, that they would have had free access. Thus we may find blood on the surface of one hemisphere, and not on the other; or filling one ventricle, and avoiding the others; or, as I remember to have seen in one remarkable instance, escaping from the veins of Galen, and diffusing itself over the surface of the brain, but not entering the ventricles, to which it appeared to have such ready access. These effusions of blood very frequently give rise to softening of that part of the brain with which they are in contact.

Hæmorrhage between the dura mater and arachnoid.

There is another situation in which blood is occasionally effused, and which, as it has been seldom noticed, requires more particular mention. I allude to the posterior or attached surface of that portion of the arachnoid which lines the dura mater. Rostan has recorded three cases, in which this form of hæmorrhage occurred to a considerable extent in females somewhat advanced in years; and he describes the symptoms which attended it, as bearing the closest resemblance to those of softening of the brain. In these cases, the layer of blood, which had detached a considerable part of the arachnoid from the dura mater, was of about the thickness of a crown-piece.

Has the dura mater a lining arachnoid?

In speaking of the effects of inflammation exhibited on the attached surface of the arachnoid, lining the dura mater, I assumed that there was such a portion of the membrane; reserving, till I came to the description of the form of hæmorrhage which I have just mentioned, any allusion to the doubts which have been held by some, respecting its existence. The mere fact of the possibility of the occurrence of this hæmorrhage appears to me to be so strong a

proof of the existence of this lining, and consequently so interesting a phenomenon, that, in addition to the three cases which I have already mentioned on the authority of Rostan, I shall present you with the details of a fourth, which occurred in this hospital.

On examining the body of a mulatto, about fifty years of age, who had lain for some time in a nearly comatose state, a considerable quantity of fluid escaped on opening the dura mater. It appeared to have been situated between this membrane and the arachnoid covering the pia mater. Blood was thinly but extensively extravasated over a great part of the inner surface of the dura mater. This extravasated blood was most copious on the left side, but by no means confined to it. It was in the greatest abundance about the base, but was likewise seen on the upper part. It presented, for the most part, a smooth polished surface towards the arachnoid covering the pia mater; and was covered by a thin, even, firm, and generally transparent membrane, which, in some parts, seemed to be double, having the effused blood between its layers. This delicate membrane could be nothing else than a portion of arachnoid reflected over the dura mater, and giving it its polished surface. Though very thin, it was too firm and resisting to be regarded as a false membrane formed from the fibrin of the effused blood. The dura mater, when this membrane was peeled off, lost its natural polish, and exhibited its fibrous texture. On different parts of the surface of the brain, but chiefly at the base, there were scattered irregular spots of an ochre-yellow colour, in which there was softening and loss of the substance of the brain; but these appearances only extended to a very slight depth. I have met with another case of this kind, in which the blood extravasated between the arachnoid and dura mater was in part diffused, and in part collected into small defined portions, forming elevations of about the size of peppercorns.

Case to
shew the
affirmative.

Farther evidence that the dura mater has an arachnoid lining.

Scrofulous tumors and malignant disease.

There are two other morbid appearances which occasionally present themselves in the same situation; and which, independently of their own particular interest, might be appealed to, if further proof were wanting, in confirmation of the existence of the arachnoid lining the dura mater.

The first of these is the production of scrofulous tubercles. As I do not remember to have ever met with these myself, I shall content myself with barely mentioning them, on the authority of Dr. Baillie. The second is the development of fungoid tumors. They are sometimes small, but very numerous: in other cases, few, or even solitary, and occasionally acquiring a large size. The symptoms to which they give rise, are frequently much less severe and considerable than we might reasonably suppose that tumors of their size, and in their situation, would be likely to excite. Out of twenty cases mentioned by Louis, there are not more than two or three which are noticed to have been attended with any other symptom than pain of the head; but this was observed to be obstinate and lancinating. Partial paralysis, and other symptoms referrible to pressure on the brain, have sometimes been observed; but this has been very rarely the case, in consequence of the slow development of the tumors. In some cases, they appeared to have given rise to epilepsy. In most, if not all the tumors of this description which I have had an opportunity of examining, the structure has been of a more firm and fibrous character than that generally to be met with in similar formations in other parts of the body. The tumors mentioned by Dr. Baillie, as spongy tumors growing from the dura mater, belong, I believe, to the class of which I am now speaking.

Fungoid tumors formed on the attached surface of the arachnoid lining the dura mater do not merely raise the former membrane and demonstrate its existence: they sometimes occasion the absorption of the dura mater, and ultimately the cranium, producing an external protuberance.

ARACHNOID OF THE SPINAL CHORD.

The unpublished researches of my friend Dr. Sharpey, respecting the distribution of this membrane, tend to shew that it is much more complicated than has hitherto generally been supposed. I am not prepared to give the details of the points which he has ascertained: and, were I so prepared, I should be unwilling to anticipate that learned and indefatigable anatomist in the publication of his researches. Yet, as elucidating and explaining some morbid appearances which we meet with, I cannot omit to state, that he finds four layers of arachnoid external to the spinal marrow; namely, one lining the dura-matral sheath; one investing the chord itself; and, between these, there are two closely-applied folds, which are in general so thin and diaphanous, as to appear but a single membrane. There are, nevertheless, interposed between them, a few filaments of fibrous texture, which are most evident at the margin of the ligamentum denticulatum. The cellular membrane of the arachnoid, investing the medulla, and constituting its pia-matral covering, differs from the pia mater of the brain, in being less vascular, and much less loose and abundant; but it closely resembles that covering the pons Varolii and medulla oblongata, with which it is continuous.

Dr. Sharpey's researches on the spinal arachnoid.

I am not aware of any instance of congenital deficiency of this part of the arachnoid. Some degree of contraction in it is occasionally induced, as a result of inflammation; and, as such, will require further notice. A congenital excess of a part of this membrane is met with in spina bifida; in which a sac is formed, lined by arachnoid, having, in some instances, three or four inches, or more, in diameter.

Deficiency and excess.

The secretion of the arachnoid appears to exist in the form of a serous fluid; which is situated in its cavity, rather than on its attached surface. The principal deviations from the normal state of this fluid appear to consist in variations respecting quantity. Here, however, we should be aware of

Secretion of the spinal arachnoid.

sources of fallacy ; since the quantity may become apparently excessive, in consequence of serum having made its way from the head, where some form of hydrocephalus may have existed. I believe, also, that the normal quantity may be sometimes reduced or augmented by cadaveric infiltration ; the one or the other effect taking place, according to the general state of the body. Of the reality of the morbid increase of this fluid there can be no doubt, when it concurs with spina bifida, in which the sac sometimes contains several ounces of serum. From the experiments of Magendie upon the fluid in the spinal canal in dogs, it appears that this fluid can be rapidly produced. The operation of tapping, which has been performed in cases of spina bifida, warrants the same conclusion in the human subject—at least, under disease. We are acquainted with few deviations from the normal character of this fluid : it is not unfrequently to be met with sanguinolent, but this may generally be ascribed to cadaveric transudation. It may, however, be mixed with blood, either from apoplexy or accidental injury. It may also be coloured with bile in jaundice, or rendered puriform when the membrane is inflamed.

Inflam-
mation of the
spinal
arachnoid.

Effects of
recent in-
flammation.

Inflammation of this part of the arachnoid is not of very rare occurrence ; but it seldom happens that patients are carried off at so early a period, as to allow of our inspecting recent appearances. I have already noticed one case complicated with arachnitis within the brain, and also one of lumbar abscess, in which the fluid in the spinal canal assumed a puriform appearance. Such fluid is sometimes produced, independently of lumbar abscess, or any other source external to the canal. It may therefore be the product of the inflammation of the membranes of the chord ; yet I believe, that, even under inflammation, the secretion is much more frequently serous than puriform. That a small quantity of plastic lymph may accompany serous effusion from the spinal arachnoid, seems to be rendered certain by the old adhesions not unfrequently met with.

Effects of
ancient in-
flammation.

The effects of an arachnitis of old date or of a chronic character are not confined to adhesions between two surfaces originally free: we sometimes find such a deposition of plastic lymph, either in the form of cellular membrane, or reduced to a denser substance, that the membrane appears thickened, and the distinction of its original layers is nearly or quite impossible. In this state, the arachnoid is not easily separated from the medulla, which is closely embraced, and even compressed by the contraction which has taken place. This state of things is analogous to, and sometimes is the continuation of that condition of the cerebral arachnoid which I have mentioned as being met with at the base of the brain, about the pons Varolii and medulla oblongata. When the effects of arachnitis are found about the cervical portion of the cord, these two states are, perhaps, always combined; but I have also met with it at the lower part of the chord, where it may exist separately.

Page 76.

Paraplegia
—how
sometimes
produced.

This thickening and contraction of the spinal arachnoid is well worthy of attention, in reference to practice. I believe it to be one of the causes of paraplegia, which must be more or less complete, according to the amount of compression exercised upon the chord; and that, when the case is not extreme, progressive improvement may take place, both by the chord becoming accustomed to its pressure, and also by the slow and partial absorption of the adventitious deposit, which, though not wholly removed, may thus become of a laxer and more yielding texture. These considerations seem to explain the progressive but slow improvement which we sometimes observe in cases of paraplegia; and should teach us to wait with patience, desisting from energetic measures, such as copious local depletion, deep and extensive setons, and other potent means of counter-irritation; which may not only be resorted to in vain, but may increase the dangerous sloughing of parts exposed to pressure, while deprived of their ordinary degree of innervation. At the same time, I wish not to be understood as recom-

mending that these cases, in their chronic state, should be left wholly to nature. I am persuaded that I have seen advantage derived from the careful and persevering use of means which are supposed to exert an influence upon the spinal chord; such as, *nux vomica*, carbonate of iron, and electricity, in conjunction with other means which the general health may require.

Attached
surface of
the spinal
arachnoid.

In those cases of arachnitis of the chord in which the inflammation had not yet passed into the chronic form, I have seen the vessels of the pia mater, at the affected part, considerably injected; and in one instance, the blood had acquired a blackish colour. Whether the arachnoid may have been injured by mechanical violence, or by exposure to cold, it is not uncommon to find the spinal chord itself more or less affected; being either softened, or having its cineritious matter unusually injected. Sometimes it presents a vermiform or granulated appearance; which may be attributed either to the compression of the contracted arachnoid, or to the turgescence of the affected part of the chord; or both causes may be combined.

Cartila-
ginous
patches on
the spinal
arachnoid.

Small patches of cartilaginous or bony matter are sometimes found about the spinal chord, varying in size from that of a mere particle, scarcely so large as a pin's head, to that of one's finger-nail, or rather more. They also vary in thickness, from that of a peppercorn to that of a melon-seed. The situation of these patches is satisfactorily accounted for, by the view which Dr. Sharpey has taken of the spinal arachnoid; since it would seem that they are situated between the two middle layers, and consequently upon the closely-attached surface of a serous membrane. But for this explanation, they would appear to form an anomaly, in being situated where the arachnoid is loosely attached by the pia mater. I am not aware of any instances of bony matter being found between the dura-matral sheath of the spinal chord and the arachnoid lining it: they have probably been seldom sought for.

The cartilaginous and bony spots which I have been describing, are frequently met with in cases of tetanus, fatal chorea, and other diseases in which the spinal portion of the nervous system has been supposed to be affected; and it has been believed that the spots in question have been concerned as a cause: nevertheless, their occurrence in other subjects in which the symptoms were absent, and their absence in some cases of the diseases referred to, would seem to set aside the necessary connexion between the symptoms and appearances. At the same time, I have no hesitation in regarding these deposits as morbid; and, as such, in considering them as indications of such a want of integrity in the spinal chord as may predispose to tetanus, chorea, and the like affections.

LECTURE IV.

ON THE SEROUS MEMBRANES.

THE PERICARDIUM.

DEFICIENCY OF THIS MEMBRANE — EXCESS, CONGENITAL OR ACQUIRED — RESULTS OF INFLAMMATION—HYDROPS PERICARDII—VARIETIES OF ADHESIONS—DIFFERENT FORMS OF FALSE MEMBRANES—COPIOUS EFFUSION IN PERICARDITIS—LAENNEC'S DIVISION OF PERICARDITIS INTO TWO SPECIES—VARIOUS PRODUCTS OF INFLAMMATORY ACTION—SCABROUS APPEARANCE OF THE PERICARDIUM—OSSIFICATION ON THE ATTACHED SURFACE—OPAQUE WHITE PATCHES ON THE SURFACE OF THE HEART—TRAUMATIC PERICARDITIS—AUSCULTATORY SIGNS OF PERICARDITIS—GANGRENE—SCROFULOUS AND MALIGNANT TUMORS OF THE PERICARDIUM—HYDATIDS.

GENTLEMEN,

THE pericardium offers one of the best specimens of a serous membrane. The majority of the cases which have been related as instances of deficiency of the pericardium have, in all probability, been merely cases of pericarditis, terminating in universal and close adhesion; yet two undoubted examples, the one recorded by Dr. Baillie, the other by Breschet, leave no room to question the possibility of such a deficiency.

Deficiency.

Excess
congenital.

I know of no example of congenital redundancy of the pericardium, unless the bridles and membranous bands, which are occasionally found to unite the two surfaces, are in some cases to be regarded as the result of original formation, rather than of subsequent inflammation. I do not myself incline to such an opinion; but as it has been adopted by some authors, it is necessary that I should advert to it. Tioch, in particular, regards adhesions of this kind, near to the apex of the heart, as congenital; and states, in support of this view, that, in certain reptiles, such a conformation is natural. We find an example of this form of pericardium in the iguana.

The pericardium may acquire, through disease, a preternatural increase of its dimensions—

Excess
acquired.

1. In hypertrophy of the heart.
2. When its cavity is distended by inflammatory or hydropical effusion; and,
3. From the developement of aneurismal, steatomatous, serofulous, malignant, or hydatid tumors.

Under the influence of inflammation, the pericardium exhibits most of the different appearances which I have described, in speaking of the serous membranes generally. Not unfrequently, it is reddened by an infinite number of minute vessels; sometimes, though rarely, its surface is preternaturally dry; and occasionally, air has been found in its cavity. It does not appear that the chemical composition of this gas has ever been examined. These states may, I conceive, be all connected with inflammation in a very early stage, except when the gas results from decomposed secretion.

Results of
inflamma-
tion.

Ex. p. hy. 34 m. a.
f -

The secretion of this membrane is sometimes preternaturally increased, without any very sensible alteration in its characters. This increase constitutes hydrops pericardii; which, though often produced by an inflammatory process, may, like other dropsies, depend at times on an atonic cause. Bertin is probably correct in stating, that many cases regarded as dropsy of the pericardium are, in fact, cases of pericarditis: and Laennec has with equal truth remarked, that the two affections run insensibly into each other; and that in the pericardium, as well as in the other serous membranes, we may occasionally find the membrane so completely of its natural appearance, the effusion so clear, and the previous symptoms so little indicative of inflammation, that the case would be unhesitatingly set down as purely hydropic, were it not for the presence of a few films of false membrane. Admitting, however, the deduction of the cases of pericarditis, there can be no doubt of the occasional existence of hydrops pericardii. In many cases,

Increased
secretion.

the existence of fluid in the pericardium is, with the greatest probability, to be ascribed to an effusion taking place just before death, perhaps in the very agony. At other times, it appears to be merely a cadaveric phenomenon.

When inflammation has altered the quality as well as the quantity of the secretion from the surface of the pericardium, we have either the highly coagulable and plastic product, or an effusion of a more puriform character. The former, as I have shewn, leads to the most perfect cellular adhesions.

Adhesions
of the peri-
cardium.

Four va-
rieties of
these adhe-
sions.

Adhesions of the pericardium, Bichat has observed, present at least four varieties in their appearance. Sometimes the surfaces of the close and of the reflected portions are so intimately united, as to appear identified; the bond of union escaping observation. Cases of this kind, as I have remarked, have been mistaken for the absolute defect of the pericardium; and the detection of this error has led into the opposite one, of denying that such a deficiency has ever occurred. In Bichat's second variety, the adhesion is more loosely effected. In the third, it is produced by a multitude of filaments; and in the fourth, by broad and membranous layers. The formation of bridles of adhesion, connecting the opposed surfaces of the serous membrane, is by no means an unfrequent result of pericarditis.

Villous false
membranes.

It is generally, and, I believe, correctly supposed, that adhesions between the two surfaces of a reflected membrane are always the result of an inflammatory process. When there is a considerable admixture of inorganizable matter, the production of adhesions is prevented; in which case, the surface of the heart is not unfrequently covered with long, shaggy, soft, and very feebly organized villi. It is this state of the heart which has, in all probability, led to the idle and absurd stories of the heart having been found covered with hair. The heart of the great Messenian hero, Aristomenes, is said to have been hairy; and a similar account has been given respecting the heart of Old Parr,

Reticular
false mem-
branes.

and of some other individual equally remarkable for his longevity. In other cases in which adhesion has been thus prevented, the surface of the false membrane has a reticulated appearance, which Corvisart, Laennec, and Bertin, have aptly compared to the inner surface of the *bonnet* or second stomach of the calf: and Laennec has also likened the surface of the false membrane, when in this state, to the appearance produced by quickly separating two slabs of marble which have been applied together, with a small quantity of butter, or some similar substance, between them. Bertin mentions a case, in which the coagulable part of the effusion formed large and thick masses which were notched like the comb of a cock. Both Laennec and Bertin speak of the adventitious deposit producing an uneven surface resembling a miliary eruption or small-pox pustules. They were probably not the products of common inflammation, but rather allied to scrofula or some of the forms of cancer. I am the more disposed to this opinion, from the circumstance, that, in one at least of these cases, the mesentery and the lymphatic glands were similarly affected. When the matter of the inflammatory effusion is of the most inorganizable kind, it has a very puriform appearance. Baillie and Bertin have both noticed this form; and a similar case is mentioned in an old record of an inspection made in this hospital.

Purulent
effusion.

The fluid part of the effusion in pericarditis is, in some cases, very copious. Corvisart mentions a case in which the effused fluid amounted to eight pounds. Bertin details a case of acute pericarditis, occurring in La Pitié, in which the distended pericardium formed a bag seven or eight inches broad, five deep, and ten or eleven in height. It displaced the lungs on both sides, and a false membrane increased the thickness of the pericardium to half an inch. The sac contained a turbid serum, mixed with coagula, which was of a most insufferably offensive odour. The heart in this case was smaller than usual. The like

coincidence of a small heart with copious effusion into the pericardium has been noticed in other subjects; and Bertin believes that the effusion occasions the wasting or atrophy of the heart. The coincidence of a small heart with considerable effusion into the pericardium, is not universal; yet it can scarcely be doubted, that when the pericardium contains much fluid, the diastole of the ventricle must be impeded, and that, consequently, an apparent, and, in protracted cases, even a real diminution of the size of the heart may take place.

When the product of inflammation in pericarditis is of the inorganizable kind, whether it be solid or fluid, the disease is liable to become chronic and latent; and the close and reflected pericardium itself becomes thickened, and almost semi-cartilaginous, probably from deposit on both the free and attached surfaces, and also in the substance of the membrane. I have seen this effect in children and young persons. When thick and recent, the false membranes formed on the surface of the pericardium, and likewise of other serous membranes, are, at times, of a consistence resembling that of coagulated white of egg. It is to this circumstance, I imagine, that we must attribute the very general, but erroneous belief, that the coagulable part of inflammatory effusion consists of albumen. In the most plastic of these effusions, it is composed of fibrin, as Dr. Dowler has fully demonstrated. The chemical difference between this and the opaque inorganizable coagula has not, as yet, been either pointed out or examined.

It seems to have been the opinion of Bertin, that, when we find the coagulated effusion accompanied by little or no fluid, the watery part has been quickly absorbed. Laennec believed that sometimes little else than coagulable matter is effused; and Dr. Baillie noticed the tolerably even diffusion of the coagulum over the surface of the heart, as demonstrative of the rapidity with which coagulation follows effusion: otherwise, he remarks, the coagulum would be

Effusion of
coagulable
matter.

found collected at the inferior part of the cavity. Such collection at the lower part of a serous cavity not unfrequently takes place, as I have already stated in my general remarks. The movements of the heart have, perhaps, at least as much to do with the pretty general diffusion of the false membrane over the surface of the organ, as rapidity of coagulation. There is some analogy between these cases and those of arachnitis related by Dr. Foville.

Laennec makes two forms of acute pericarditis. The one he calls *pericardite franche*, or simple pericarditis, in which the effusion is merely a mixture of serum and coagulable matter: it is the form the most favourable to a speedy and salutary termination. The other he calls *pericardite hémorrhagique*, in which an exudation of blood accompanies the other matter of effusion. This complication he regarded as tending to render the affection chronic, and likewise modifying the character which the product of inflammation ultimately assumes, by favouring the formation of cartilage, fibro-cartilage, or bone. Of the accuracy of the latter part of this opinion, as I have already observed, I am not convinced. The effusion of blood in pericarditis is probably rather an effect, than a cause of the severity of the inflammation. A slight admixture of blood not unfrequently accompanies many preternaturally increased exhalations and secretions, whether inflammatory or not: it may be seen in the perspiration from the skin, the mucus from the nose, the urine, the secretion from the testes, and in hydropic effusions, as well as in the inflammations of the serous and the mucous membranes. The different appearances which we meet with in the product of inflammation may more correctly be referred to the plastic and to the inorganizable forms of effusion to which I have particularly called your attention in a former Lecture, and to their various combinations. Hence, we have not only the two extremes of delicate and perfect cellular tissue, and perfectly inorganizable pus, but also cartilage, fibro-cartilage, a white, com-

Laennec's
two forms of
pericarditis.

paet, but pliant structure, not sensibly fibrous, and likewise bone. We may find most of these in conjunction with adventitious cellular membrane. In a specimen in which one of these combinations is very distinctly seen, there are three adventitious layers between the close and the reflected portions of the pericardium. The middle one is of a pliant compact semi-cartilaginous structure. On each side of this, there is a thin layer of cellular tissue, by which it is connected to the pericardium. This state of things is most readily accounted for, by supposing that the middle layer was first formed, that it was but feebly organized, and that, the fluid part of the effusion being absorbed, this layer was in contact with both surfaces of the pericardium, until raised and detached by a second attack of inflammation, which led to the formation of the two cellular layers. When the pericardium has been the subject of inflammation, we sometimes find the adventitious membrane raised by the serum beneath it, so as to form vesicles or bullæ, which are often of considerable length, in proportion to the breadth of their bases. The margins of the heart, not far from the apex, are the common situation of such bullæ.

The bridles or bands of adhesion between the opposed surfaces of a pericardium which has been inflamed, are apt, when they become organized, to exhibit vessels in straight and parallel lines, producing some resemblance to muscular fibres.

Acute pericarditis appears to be of by far the most frequent occurrence in young persons just arrived at, or but little past, the period of adolescence. It is probable that the danger of pericarditis is commonly much overrated, and that its comparative frequency is equally underrated. Louis's researches lead him to the conclusion, that pericarditis attacks, on the average, about one person in twenty.

Scabrous
form of in-
flammatory
product.

The pericardium is apparently more prone than any other serous membrane to that form of inflammatory deposit which leads to the production of minute firm elevations, resembling

the papillæ of the tongue, and occasionally rendering the surface of the membrane scabrous. I have seen examples of this form of pericarditis succeeding to a former attack of inflammation which had produced numerous bridles of adhesion. These bridles, as well as the surface of the close and reflected serous membrane, were covered with these papillæ.

Inflammation of the pericardium not unfrequently leads to a deposition behind the reflected, as well as on the close portion. Whilst on the free surface bony matter is of rare occurrence, and is seldom if ever found except in small isolated masses, on the attached surface the compact product of inflammation is apt to assume the form of bony plates. These cases, when the extent of ossification has been considerable, have been erroneously described as ossifications of the heart; and they have, I suspect, been somewhat exaggerated, by those who have wished to find in them an argument in favour of the arteries possessing the power of propelling the blood, and, consequently, muscular structure and function. One of the most considerable examples, with which I am acquainted, is seen in a preparation belonging to our Museum. The osseous plate occupies a large portion of the base of the heart, where it forms a complete bony ring. The apex of the heart is, however, left at liberty; and, consequently, the contractions of the ventricles, though doubtless much interfered with, were by no means wholly prevented. It was taken from a young woman twenty-two years of age, who had laboured under ascites for ten months, and had been tapped ten times. The ascites was preceded by an attack of dyspnœa with orthopnœa, which subsided in a fortnight. No symptom connected with the thoracic viscera was afterwards noticed.

It is very common to find one or more opaque white patches on the surface of the heart. Dr. Baillie says that they may be dissected off; and Laennec says that this is frequently the case. I have met with one or two instances in

Ossification
on the at-
tached sur-
face.

Opaque
white
patches on
the surface
of the heart.

which this might have been done; but I certainly agree with Corvisart, in thinking that, in by far the greater number of cases, these patches depend on a deposit on the attached surface. They are generally found on the anterior part of the right ventricle, and rather nearer to the apex than to the base of the heart. They are, however, by no means confined to this situation. Respecting the cause of these spots, which can scarcely be regarded as a morbid appearance, nothing certain is known. From the circumstance of their being often found immediately under the sternum, and from their being occasionally met with on other parts of the heart to which a firm and resisting body has been unusually opposed—as, for example, where a bony deposit has taken place beneath the reflected pericardium, or when an uneven and remarkably indurated liver has, even through the diaphragm, presented an unequal pressure against a particular part of the heart—I have thought it probable that such pressure, aided by the movements of the heart itself, may have led to the production of these spots. These formations may certainly take place at a very early period of life. I have met with one rather loose and thick, but in other respects perfectly resembling those found in the adult, on the right ventricle of the heart of a child only ten weeks old. Similar thickening of the close pericardium sometimes marks the course of the coronary arteries and their branches; and this circumstance, amongst others, tends to confirm the idea which I entertain, as to its mode of formation.

Almost all the cases of pericarditis, which come under our notice, are the result of disease, either originally commencing in the heart, or transferred to it from some other part; often from synovial membranes affected with rheumatic inflammation. Instances however do occur, in which the inflammation of the pericardium has been excited by mechanical violence done to the membrane. The following appearances were observed in a case of this kind, which fell

Conjecture
as to the
modes of
their pro-
duction.

Traumatic
pericarditis:
with case.

under the notice of my friend Dr. Ferrus, of the Hospice de Bicêtre.

A man died twenty days after he had stabbed himself through the heart. The weapon, a small one, acting as a stiletto, remained in the wound, transfixing the left ventricle, and penetrating the cavity of the right. The pericardium contained ten or twelve ounces of reddish serum, of a fetid smell, and mixed with numerous discoloured fibrinous coagula. Some of these coagula adhered to the surface of the heart, and formed a sort of case for the organ. The pericardium was described as thickened, rough internally, and more vascular than usual. It is worthy of remark, that, in this case, the contractions of the heart had been accompanied by the sound designated, by Laennec, as the *bruit de lime*, or similar to the stroke of a file: it was likewise compared to the sound which may be heard over a varicose aneurism. It is true, that this sound may have been produced by the instrument lodged in the substance of the heart, and transfixing the left ventricle; but I imagine that it may have been produced by the state of the pericardium. Collin, whose authority with respect to the indications obtained by the use of the stethoscope is scarcely inferior to that of his master, Laennec, has pointed out a peculiar sound, compared to the bending of new leather, which he has known to accompany some cases of recent pericarditis. Two cases of pericarditis, which occurred in this hospital, were accompanied by perversion of sound, which, in one of them at least, was a kind of *bruit de scie*, or sawing sound. In both, the pericardium was rough; and, in that in which the *bruit de scie* was observed, it was covered, on both surfaces, with numerous minute papillæ. I am induced to mention these particulars, though I am aware that I am rather stepping out of my province in alluding to symptoms, because the facts appear curious, and may tend to explain some cases, in which *bruit de scie* had been noticed, and valvular disease had been erroneously predicted. It must not how-

Auscultatory symptoms in pericarditis.

ever be forgotten, that pericarditis, and perhaps rheumatic pericarditis most particularly, is apt to co-exist with effusion between the folds of membrane forming the valves, and that the sounds observed may occasionally depend on this cause; whilst, in other cases, they may be produced by extremely minute and tender deposits upon the surface of the valves.

Gangrene.

Gangrene of the pericardium is an extremely rare occurrence. I can say nothing respecting it from my own observation; but some examples have been given by Lieutaud.

Bloody spots are sometimes found on the surface of the heart beneath the close pericardium, the effect of purpura rather than of inflammation.

Scrofulous and malignant tubercles.

Scrofulous tubercles are very uncommon in or about the pericardium. Baillie mentions having seen three tumors of this kind, of about the size of a walnut. Tumors of the malignant kind, such as fungoid, cancerous, and melanotic, are sometimes, though by no means frequently, met with, affecting the pericardium: they are, as I believe, formed on the attached surface, and are generally accompanied by other tumors of the same description in different parts of the body; which circumstance will sometimes throw light on their nature. In one of the specimens of this morbid appearance contained in our Museum, the tubercles are of considerable size, and are marked by slight traces of a melanotic character. In the patient from whom this specimen was taken, the disease had made its appearance in many organs and tissues; and proved fatal, by affecting the spine. In another case, there are some decidedly melanotic tubercles beneath the pericardium as well as in the substance of the heart. Bertin gives a case, in which the pericardium was thickened, and covered with minute granulations, which appeared to be of a malignant character; and another, in which the pericardium was much thickened, and connected with a fungoid mass developed under the sternum. Acephalocyst hydatids have been found between the close pericar-

dium and the substance of the heart. In a specimen of this description presented to the Museum by my friend E. C. May of Tottenham, there were acephalocysts of various sizes, sufficient to fill a quart measure. The sac containing them was situated in part beneath the close pericardium, and partly beneath the pleura pulmonalis of the right side.

LECTURE V.

ON THE SEROUS MEMBRANES.

THE PLEURA.

DEFICIENCY OF THE PLEURA—EXCESS.—RESULTS OF INFLAMMATION—APPEARANCES IN THE EARLY STAGE OF INFLAMMATION—FORMATION OF ADHESIONS—SEMI-CARTILAGINOUS PRODUCT OF INFLAMMATION—EMPHYEMA—NATURE OF THE EFFUSION IN EMPHYEMA—CHARACTERS OF TRUE PUS—PURULENT EFFUSION MODIFIED BY CONTINUED CONTACT WITH THE SECRETING SURFACE—SYMPTOMS OF EMPHYEMA; AND ITS CONSEQUENCE, THE CONTRACTION OF THE THORAX—SPONTANEOUS EVACUATION OF THE FLUID IN EMPHYEMA—BEST MODE OF PERFORMING PARACENTESIS THORACIS—ASSISTANCE OF THE STETHOSCOPE IN EMPHYEMA—OPENING OF EMPHYEMA INTO THE BRONCHI—PNEUMOTHORAX, AND UTILITY OF AUSCULTATION IN DIAGNOSING IT CORRECTLY.—WORM-EATEN APPEARANCE OF THE PLEURA—PARTIAL PLEURISIES—DETACHED BODIES IN THE PLEURA—HYDROTHORAX, ATONIC, IDIOPATHIC, AND SYMPTOMATIC—BLOOD IN THE PLEURA.—EFFECTS OF INFLAMMATION ON THE ATTACHED SURFACE OF THE PLEURA—OSSIFICATION BENEATH THE COSTAL PLEURA—CYSTS IN THE SAME SITUATION—GANGRENE OF THE PLEURA—SCROFULOUS TUBERCLES—MALIGNANT DISEASE—HYDATIDS BENEATH THE PLEURA.

GENTLEMEN,

Deficiency
and excess.

I KNOW of no case in which deficiency of the pleura is met with, except in monsters, in whom the lungs are either partially or wholly wanting. Excess of this membrane is also very rare. We have, however, examples of it; as when the lungs are divided into more than the ordinary number of lobes; and when prolongations of the pleura cover deposits of fat, of adventitious structures, large vesicles, and bullæ, and the like.

Altered
secretion.

In my general remarks, I had occasion to notice various lesions of secretion which are exemplified in the pleura; such as, dryness of the membrane, morbid increase of the fluid effused, and its assumption of a viscid, ropy, mucous character, which was frequently observed in those who had died of cholera. Sometimes the secretion of the pleura is

sanguinolent; at others, it is tinged with bile; and sometimes air is found in the cavity of the pleura.

The pleura is, of all the serous membranes, that which is the most liable to inflammation; and it affords a great variety in the appearances of the product of this process. The general remarks which I offered in my former Lectures had so decided a reference to the effects of inflammation as exhibited in the pleura, that it would occasion a tedious repetition, were I minutely to describe them, in reviewing the serous membranes particularly.

Results of inflammation.

Like the pericardium, the pleura has been seen preternaturally dry. This is probably more or less the case at the commencement of every attack of pleuritis; but, as patients are very rarely carried off in this stage of the complaint, the phenomenon is seldom presented to our view. Medical authors have, it is true, frequently treated of dry pleurisies; but there appears to have been a want of accuracy in some of these accounts; and where this objection is unfounded, they refer to a state different from that to which I have alluded, but of which I shall hereafter speak. If inflammation continue, the secretion soon returns, increased in quantity, and altered in quality. The altered secretion may be produced with great rapidity. I have known the affected side of the chest become completely dull, on percussion, in the space of a few hours, and manifest dilatation follow shortly after. These changes, and an unequally increased vascularity, producing an appearance of minute irregular red points, are what we generally find in the most recent cases of pleurisy. Laennec agrees with Bichat, in thinking that, before death, the inflammatory redness is diffused and uniform.

Dryness of pleura.

The morbid effusion admits of every variety, from the most plastic to the least organizable; the former producing adhesions, which, as in the case of the pericardium, are either extremely close and intimate, or loose, or filamentous. Adhesions of the pleura, of one or other of these forms, are

Pleuritic adhesions.

the most common of all morbid appearances ; and are found, to a greater or less extent, in nearly all the bodies which are subjected to inspection. These adhesions have, like those of the pericardium, been erroneously regarded as dependent on natural conformation, and called ligaments of the lung. Vernojus advanced the truly ridiculous idea, that they were produced by laughing ; and even the great Morgagni did not reject this opinion. More recently, as Laennec tells us, some distinguished Professors of the School of Paris attributed them to a kind of destruction of the pleura.

Semi-cartilaginous product of inflammation.

It is a circumstance of no very rare occurrence for the effused organizable matter to assume a semi-cartilaginous, instead of a cellular form. This appears to be more particularly the case, when the inflammation has assumed a chronic form ; which it is liable to do, when either the fluid part of the effusion is not duly absorbed, or when organization is retarded, and irritation kept up by the presence of inorganizable matter in the product of inflammation. Hence, I believe it to be the common state of the product of inflammation, after the absorption of the fluid in empyema. When this inorganizable matter is very abundant, and diffused through the fluid in the form of minute particles, which render it turbid, or even opaque and puriform, it constitutes empyema. This disease has often very erroneously been attributed to the bursting of an abscess of the lungs into the cavity of the pleura ; a circumstance, which, though it sometimes takes place, is certainly a very rare occurrence. It may however happen, that a softened tubercle may be evacuated into the cavity of the pleura, instead of by the more usual course of the bronchial tubes ; and thus become the exciting cause of pleurisy, and consequently of empyema.

Empyema.

The term empyema has been used in a very vague manner, and seems to have been applied to every form of effusion into the cavity of the chest. Thus we hear of empyema of blood, empyema of air, and empyema of pus. Empyema

has also been employed to designate the operation of tapping, to evacuate these collections in the thorax; and their spontaneous evacuation by a natural opening has been called 'empyema of necessity.' The term is now pretty generally restricted to the sense in which I have employed it; viz. to designate the collection of a puriform fluid in the bag of one or other of the pleuræ. This acceptation is most accordant with the etymology.

I have said, that the fluid collected in the affection of which we are speaking, is puriform; and you will perhaps think that there is something vague in this expression. I admit that there is a considerable vagueness, not merely of expression, but also of opinion with, respect to the pleuritic effusion of which I am speaking. Sometimes it is called pus, sometimes puriform, at others sero-purulent, or the like. This want of exact definition, it must be allowed, depends on the inherent difficulty of the subject. Notwithstanding the labours of Young, Home, Darwin, and many others, it cannot be said that we are yet possessed of a decisive and certain test for pus. Its misceability in water—its sinking in this fluid—the odour which it exhales when thrown on hot iron—various chemical re-agents; such as, sulphuric acid, muriate of ammonia, and oxymuriate of mercury—and the very ingenious optical test, with the eriometer—have all, more or less, failed in completely answering the purpose for which they have been proposed. Whilst, by some persons, and more especially by those who are partisans of the organizability of pus, this appellation is given to a great variety of products, from opaque concrete membranous flakes, down to a mere serum, rendered turbid by the intermixture of a few irregular minute particles, but becoming clear by rest and the subsidence of the particles; others restrict the term to the slightly-thickened, opaque, muciform, particled matter of the kind produced by a healthy abscess; which, in its consistence, bears a considerable resemblance to cream, and shews no

Character
of the effu-
sion in
empyema.

disposition to separation. Its characters are then so marked and decisive, that a mere inspection will generally suffice to determine its nature; and all the tests which I have mentioned will, if appealed to, almost invariably confirm the decision. Were the particles contained in this secretion well-defined and uniform globules, as some have asserted, we should possess, in the microscope, infallible means of distinguishing true pus from those fluids with which it has, at times, been confounded. It happens, however, unfortunately for these observers, that the particles contained in pus, though generally smaller and much less variable in size than those of the other fluids in question, are, nevertheless, very irregular in this respect, as well as in their form, which is any thing but globular or circular. Again: true pus is liable to be disguised, in some of its properties, by the secretions with which it may be mixed. A striking exemplification of this remark occurred to my friend C. A. Key; who, having received, for the purposes of experiment, some remarkably good-looking pus, obtained from an abscess in the breast, was disappointed in most of the chemical tests he employed, but ascertained that coagulation was caused by rennet. Here the properties of pus were undoubtedly masked by the milk with which it was mixed.

Pus disguised by admixture with healthy secretions.

I do not wish to restrict the use of the word 'pus' to the product of the inflammation of the cellular membrane, or of an abraded surface; and I confess my inability to define its precise limits: nevertheless, I agree with those who hesitate to apply the term to very many of the turbid, particled fluids which at times are met with among the products of inflammation of the pleura and other serous membranes. Although, in their turbidity, their particled form, and, above all, their inorganizable properties, they bear a very close relation to pus, yet the far greater variety which they present, in the size of their particles, their disposition to separation on rest, dependent on the thin and serous or watery character of the fluid part, and their want of that

muciform and cream-like consistence so conspicuous in true pus, form, in my opinion, a distinction too marked to be broken through.

I do not, however, deny the possibility of unabraded serous surfaces producing pus; but I think it comparatively a rare occurrence, more especially in the pleura. Pus, as you may have observed, does not acquire its characteristic properties until it has lain on the secreting surface for some time after its effusion. Sir Everard Home, who adopted the erroneous idea that the particles of pus are identical with those of the blood, admitted that, on its first effusion upon an abraded surface, pus is a transparent fluid, and that it subsequently becomes turbid or opaque. It can scarcely be supposed that this change is effected solely by the material being kept at a certain temperature. It seems much more probable, that it is a vital process, in which the most important influence is exerted by the living solid parts with which the pus, in process of formation, remains in contact. In speaking of this change as a vital process, I wish to be understood as not using the term 'vital' as a mystification, involving obscure ideas of the nature of life, but merely to indicate a species of change quite cognizable to our senses, and of the nature of that which takes place in other secretions; such as, milk and mucus, which are evidently altered by remaining in the gland, or on the surface which produced them. The formation of false membranes likewise tends to shew that secretions continue to receive a modifying influence, after they are effused, from the surrounding solid parts. If, in addition to these facts, we take into consideration the expression, 'well-concocted pus,' employed by the older pathologists—which seems to imply their having observed that, in addition to secretion, a superadded process was necessary—I think we may readily conceive why the copious and rapidly-formed effusions met with in the pleura cannot commonly possess the characters of true pus; that since the extent of surface is so small, in proportion to the

Pus partially formed by contact with the secreting surface.

amount of the secretion, the greater part of the fluid can scarcely come under its influence. The same considerations will account for the occurrence of more completely-formed pus in a greater number of cases of inflammation of the peritoneum, which presents a large and irregular surface, than of pleuritis; and for the decidedly purulent characters of small circumscribed collections of effusion occasionally met with between the convolutions of the intestines and the parietes of the abdomen. It is perfectly in accordance with this observation, that in partial pleurisies—as, for example, those which are confined to interlobular fissures—the small quantity of the product of inflammation, if not highly plastic, is liable to pass into the form of genuine pus: such collections being brought much more intimately into relation with the living and secreting surface, than is the case with the more copious collections of fluid which are formed in cases of extensive general pleurisy.

Laennec generally calls the turbid or opaque fluids collected in the pleuræ, in cases of pleuritis, ‘sero-purulent’; and this expression, indicative of their mixed character, is the most appropriate and the least exceptionable which we can adopt.

When, in a case of empyema, this sero-purulent effusion is very copious, the side of the chest which it occupies is dilated, and the intercostal spaces are protruded. Hey says that the intercostal spaces, when thus distended, yield on pressure, but again protrude when the pressure is removed. A dull sound is afforded by percussion. Respiration cannot be heard, or at most only in the immediate neighbourhood of the spine, or at points where previous adhesion may have attached the lung to the pleura costalis. The ribs of the affected side have little or no motion, the lung is compressed into a very small compass, and, unless restrained by previous old partial adhesions, is closely applied to the spine. This state is rendered, in most cases, permanent and irremediable, not only by the altered condition of the substance

of the lung, but also by the adventitious membrane which invests it. It must have been from the inspection of patients who have died under circumstances such as I have just described, that Panarolius and other ancient morbid anatomists were induced to conceive that the lung was sometimes quite destroyed. There is a fulness of the hypochondrium from pressure upon the diaphragm; and it has been generally supposed that, when one side of the chest is filled by fluid, as in empyema, the mediastinum is pressed upon, so as to interfere in some degree with the functions of the sound lung, and to occasion the increased dyspnœa which is felt by most of those who are labouring under empyema when they attempt to lie on the sound side. Richerand denies, or at least doubts, the truth of this pressure, and consequent displacement of the mediastinum—not having been able to detect any thing of the kind in the dead subject; when, for the purpose of experiment, he had opened both sides of the thorax, without interfering with the sternum or mediastinum, and, having placed the subject on one side, had filled the other with water. I cannot admit that this ingenious experiment completely represents the state of the chest in empyema. Because the mediastinum, after death, is not materially displaced by the pressure of a few pints of water, we are not warranted in inferring that no such displacement can occur during life, when the tissues have the power of accommodating themselves to circumstances; and when the pressure is long continued, and is not merely dependent on the weight of the fluid, but also on its continued effusion, which gives it a force sufficient to protrude the intercostal muscles, and sensibly to dilate the affected side of the chest. We have, moreover, very satisfactory evidence that this displacement is at times effected, in the well-authenticated, but by no means frequent fact, of the heart's being pushed over to the right side by copious effusion into the left pleura. One instance of this kind is mentioned by Samuel Cooper, who himself saw the case in

Possibility
of pressure
on the
mediasti-
num pro-
ducing dis-
placement.

Bartholomew's Hospital. Others are narrated by Baron Larrey, Pelletan, Boyer, and Lobstein: and an example occurred to the late Dr. Baillie, in which the unusual situation of the heart's beat induced that distinguished master of diagnostic tact to suspect for some time that there was a natural transposition of the viscera. I have been told, that the evident mortification which he felt, when the true cause of this anomaly was afterwards explained, afforded a striking proof of his general accuracy. Several other instances of the phænomenon questioned by Richerand, have come to my own knowledge.

Empyema
on the left
side.

It has been stated, that empyema is very rarely met with on the left side; and I believe that it is certainly less frequent than on the right. Though I have known of several instances, I cannot state in what proportion they have occurred.

Contraction
of the tho-
rax conse-
quent on
empyema.

If the patient bear up against the constitutional irritation attendant on empyema, the fluid is sometimes gradually absorbed, and the affected side of the chest, from being preternaturally distended, becomes remarkably contracted. This change is not simply the result of the parietes passively following the absorbed fluid, but is, I believe, in a greater degree attributable to the contraction of the new structure. It is very easy to recognise the cases in which this process has taken place. The dulness of sound, on percussion, continues more or less complete. There is a peculiarity in the attitude and gait of the individual. He has the appearance of inclining to the affected side, even when endeavouring to stand upright. The chest is manifestly smaller, and narrower, on the affected, than on the sound side. Although, on measurement, the difference between the two sides is found to be less than the appearance would have led us to suspect, yet we may often detect upwards of an inch of difference between them. The intercostal spaces are contracted—the shoulder is lower than on the sound side—the scapula is not closely applied to the,

Symptoms
of the con-
traction.

chest—the muscles, but more particularly the pectoralis major, lose their volume. The spine, in the mean time, generally continues nearly or quite in its natural position; yet it may at length acquire a slight distortion, from the habit, which the patient falls into, of inclining to the affected side. The same habit gives a sort of limp to the gait. This result of pleurisy, accompanied by copious effusion which has not been promptly absorbed, is of pretty frequent occurrence; and it is certainly very surprising that it should so long have remained unnoticed. Laennec, who was the first to describe it, has related several interesting cases, illustrative of the fact. In some of these, the lung on the affected side gradually resumed a part of its functions; the sound of respiration was audible with the cylinder; and, though the deformity of the chest was striking, the state of the individual permitted active exercise, and the long and public exertion of the voice.

The cure of chronic pleuritis by the contraction of the chest, the most favourable termination of which it is susceptible, will sometimes take place, in spite of the presence of a considerable quantity of inorganizable matter. This, after the fluid part is absorbed, is shut up in a cyst or envelope formed by the organizable part; and may so remain, without becoming a serious source of inconvenience. In such cases, it sometimes acquires a bony or earthy character. At other times, the absorption of the fluid, and the contraction of the chest, may have proceeded for a considerable time, when a new irritation, favoured by the presence of much inorganizable matter, may give rise to fresh effusion; and under this second attack, I have seen portions of the adventitious formation lining the cavity detached and mingled with the puriform effusion. In many cases, the fluid is not wholly removed by absorption, but a portion escapes by an external opening. A young man of my acquaintance, who had been greatly reduced by a long-continued discharge from an external opening in the pleura, so far recovered, as

*see Graves 231. Mem. Med. Potatoes & Pinesapples in
- Nutritive & very good. MS.*

to enjoy tolerable health, although one side of his chest became perfectly useless, and was scarcely three inches in depth from before to-behind.

Process of
nature in
the 'em-
pyema of
necessity.'

The evacuation of the fluid collected in empyema by means of a spontaneous external opening is not only an extremely interesting fact in morbid anatomy, as affording an excellent specimen of a natural operation for the relief of the system, but it also deserves careful consideration, with a view to obtaining some useful hints as to the recommendation and performance of the surgical operation for the removal of the effusion. These cases of 'empyema of necessity,' as they have been called, are not of very rare occurrence; especially if we include among them the cases in which, an evident pointing having taken place, the perforation of the integuments has been assisted by art. Several examples of this kind are noticed in Dr. Young's laborious work on Consumptive Diseases. Andral has related three cases; and at least as many have come under my own knowledge. I believe that the greater number of them terminated favourably. At any rate, I think there can be no doubt that a greater proportion of patients have recovered after the spontaneous evacuation of the fluid than after the simple operation of paracentesis. It is very desirable and interesting to know the steps through which the natural process is conducted. The fact, that, for a considerable time, the structure of the serous membranes remains, to all appearance, almost healthy beneath the product of their inflammation, adds to the difficulty of the subject. It appears that sometimes an abscess is formed externally to the intercostal muscles, and becomes, by a double opening, the medium of communication between the cavity of the pleura and the surface; and Laennec mentions the partial gangrene of the lung and pleura as occasionally leading to 'empyema of necessity'; but the process has not been particularly investigated by any author, and I have not myself had the opportunity of watching throughout any of the cases which I

have seen during life, or of examining them after death. I suspect, however, that, in some cases, the process resembles one which more frequently occurs in the peritoneum; viz. that when a considerable quantity of the inorganizable product of inflammation is collected, ulcerative absorption takes place in that part of the serous membrane with which it is in contact, and that, by a continuation of the same process, the external opening is effected.

The operation of tapping the chest is one of very great antiquity and importance. When properly performed at the right time, I have no doubt that it often affords the best, if not the only chance of the patient's recovery; but it must frequently depend upon a very nice point, whether it is to prolong life, or to accelerate death. The fact, that in a large proportion of cases, if not in the majority of them, the result is fatal, has, in all probability, been the chief cause of this operation being often either wholly neglected or too long delayed. As there are some points in the anatomy of empyema which are intimately connected with this operation, I shall not consider myself as stepping out of my province in going into the consideration of the subject.

Paracentesis thoracis.

When a pleura, in which no previous adhesions have been produced, becomes affected with inflammation of a form leading to the copious effusion of sero-purulent fluid, or, in other words, to empyema, the lung is closely compressed against the spine, and the surface of the pleura pulmonalis is covered by an adventitious coating, which is generally soft, loose, and little organizable, but differs considerably in its thickness in different cases. Not only have the opposed surfaces of membrane very little if any disposition to adhere, but they are separated by the abundant effusion, which is often not merely turbid, but thickened by a multitude of opaque particles dispersed through the serum, very irregular in size and figure, and evidently similar in consistence to the flocculent surface of the coating before mentioned, from which they were probably detached. In what-

State of the lung and pleura in empyema.

Place of
election in
paracen-
tesis.

ever part we may puncture a chest in this condition, except in the immediate neighbourhood of the spine, and consequently in the situation of the compressed lung, we can scarcely fail to penetrate the cavity containing the fluid, and to evacuate a part of it, if the patient be placed in a proper position. Asclepiades used to perforate a rib; but this seems to be worse than needless trouble. The intercostal spaces are generally, and very properly, preferred; but even these afford considerable room for choice. The lower, anterior, and somewhat lateral part of the chest has been generally selected. Though this is the most depending part, when the patient is standing, or sitting with an inclination forward, it is by no means the case when he is in the recumbent posture. Laennec has recommended that the opening should be made about the middle of the side, between the fifth and sixth ribs, just anteriorly to the insertion of the serratus magnus. Where there are no pleuritic adhesions, or other complications, it is probably not of much importance whether the place recommended by Laennec, or that commonly chosen, be selected; but frequently these complications do exist, and the proper choice of the spot for the opening is then a matter of great moment and difficulty. When a previous inflammation of the pleura has effected strong and permanent but partial adhesions between the pleura pulmonalis and costalis, it is obvious that this circumstance must affect the position into which the lung will be compressed by the sero-purulent effusion, since the part at which the adhesions exist will remain in contact with the side. If the puncture were unfortunately made at this spot, not only the effusion would not be evacuated, but the lung would be injured, and very probably be prevented from ever recovering that degree of respiratory power which might otherwise have been restored to it. There is no situation in which such adhesions more frequently occur, in complicated empyema, than at the summit of the lung, where they are often induced by tubercles. In this situation,

few persons would attempt to perform the operation, unless a decided pointing were to indicate that nature was herself preparing an opening at this spot; in which case it would be the most eligible, and experience has shewn that the result may be favourable. Another situation in which the adhesions of which we are speaking are likely to occur, is about the lower lobes, and consequently at the very spot which is generally selected for the operation. Their frequency at this part of the chest is, I believe, to be attributed to the lower lobes of the lungs being the parts by far the most prone to pneumonic inflammation; and we, comparatively, seldom find this affection unaccompanied by inflammation of the corresponding part of the pleura. Since in this complication we have not merely the pleuritic adhesions, but often a more or less complete dulness of sound on percussion, in consequence of the morbid state of the lung, it must necessarily be difficult, or even impossible, to distinguish such a case from one in which the dulness of sound depends upon the pleuritic effusion. This, though a strong reason, is not the only one for preferring the spot recommended by Laennec. Another, of at least equal force, is to be found in the fact, that the diaphragm is sometimes carried up into the thorax, far above its origins, and is united, by adhesions on its upper surface, to the pleura costalis. The space which the abdomen thus gains on the thorax is occupied by the liver, if, as is generally the case, it be on the right side that the encroachment has taken place: indeed, the enlargement of the liver is often the sole or the principal cause of the elevation of the diaphragm. We have, then, both the dull sound and the fulness of the hypochondrium which may be mistaken for the effects of effusion. It is sufficiently obvious, that if the operation for empyema were to be performed at the spot usually recommended, on a chest in which this elevation of the diaphragm had taken place, the abdomen, instead of the thorax, would be penetrated. This is not a merely supposed danger. Laennec, in the first

Reasons for
preferring
the spot
chosen by
Laennec.

*Enlarged
liver*

Value of
auscultation
in empyema.

edition of his work on Mediate Auscultation, has given the details of a case in which the occurrence alluded to actually took place. Whatever may be said by those who attempt to depreciate the stethoscope as an aid to diagnosis, and who insinuate that it is a useless refinement to discover the particular part of the lung which is diseased, or the precise form and extent of its derangement—that the treatment and termination of phthisis will be just the same, whether pectoriloquism be heard above the clavicle or in the axilla; there can be no doubt, that when, as in the case of empyema, a surgical operation is to be performed upon the chest, the most invaluable assistance may be derived from it. It makes all the difference, between the hesitation or rashness of ignorance and uncertainty, and the cool confidence which knowledge alone can inspire. The late Dr. Gregory of Edinburgh, in a very remarkable and interesting publication, entitled a Memorial to the Managers of the Royal Infirmary, has given a curious and amusing illustration of the doubt and difficulty which attended the treatment of these cases, before medical men were acquainted with the methods of investigation introduced by Avenbrugger and Laennec. With much ceremony, a multitude of surgeons were collected in the consulting-room, with the poor patient before them. A long discussion resulted in nothing being attempted. On the other hand, I may mention, that Laennec, having occasion to meet a surgeon who was to perform paracentesis for empyema, saw the trochar plunged into the chest, but no fluid follow. Confident, from his own examination, as to the situation of the fluid, he took the instrument himself, though unaccustomed to operate, and immediately gave exit to the effusion. I have heard Laennec relate the fact.

Prognosis
in paracentesis.

Although the opening may have been made in the best possible situation, and great temporary relief afforded to the patient, we must never be very sanguine respecting the ultimate result. The unhealthy and feebly organizable cha-

racter of the false membrane which we know to line the cavity from which the fluid has been removed—the impossibility of the lung's promptly expanding, to fill the place evacuated by the sero-purulent effusion—the unavoidable admission of air to the vacant space—and the decomposition of the fluid still existing in the cavity, favoured by the contact of the admitted air—all contribute to oppose the recovery of the patient. Yet, as his recovery will at times take place, notwithstanding all these impediments, we ought not to be deterred from having recourse to an operation which may lead to a cure, or, if it fail in obtaining this desirable end, may prolong life and diminish suffering; whilst, at times, it affords the only means of warding off immediate suffocation.

The choice of the mode in which the opening is to be made, is a subject well worthy of consideration. When the operation is ordered for the purpose of averting death by suffocation imminently threatening, there can be little doubt but that incision with the knife, or puncture with the trochar, will be the readiest and best method. It will of course be accompanied by the usually-recommended precautions, of making the opening in such a manner, that it may be spontaneously closed on the removal of the canula, and of evacuating only a moderate portion of the effusion at one time. When the operation is not ordered on so pressing an emergency, it may be allowable to doubt, before giving the preference to the trochar. I confess, that in a case such as I am now supposing, I should be strongly inclined to give the preference to an opening effected, at least in part, by cautery. I should do so, in the first place, because the operation thus performed would be a more faithful imitation of the natural operation, which, as I have before stated, leads to a larger proportion of successful results than the purely artificial mode: and secondly, because a strong external irritation, such as that produced by a cautery, is one of the most powerful means of promoting

Mode of
operation—
by knife or
cautery?

the removal of the fluid by absorption. Those who will take the trouble to refer to the older authors, will find numerous cases of supposed consumption, which evidently were cases of pleuritic effusion, cured by cautery applied to the chest. Several cases of this description are noticed in Dr. Young's work on consumptive diseases. Whilst, then, we are preparing a way of escape for the effusion, we are, at the same time, giving to nature the best chance of removing it herself; and we may, perhaps, fortunately find, that before an opening is effected, she has so well performed her part, that the plan may be changed, and, instead of completing the perforation of the chest, we may co-operate with nature by the application of one or more additional cauteries. When this desirable result does not follow the use of the cautery, and we are left to pursue our plan of opening the chest principally by this means, I believe that the cavity will be in some degree prepared for the opening; whereas it is taken by surprise by the trochar. You will think that the idea which I have just advanced is somewhat fanciful; but it is a fancy founded on the observation of the operations of nature. I am aware that the advocates for the use of the trochar may adduce, in support of their side of the question, the story of an individual, who, feeling that he was labouring under what he conceived to be a fatal affection of the chest, entered the army, with the hope of dying in battle, rather than by a lingering disease; but who, instead of falling in an engagement in which he was much exposed, had the singular fortune to receive a wound in the chest, by which the fluid was evacuated, and his health restored. Thus he found his life, where, and in the very means by which, he hoped to lose it.

It may sometimes be desirable to test the presence of fluid in the pleura by an experimental opening. To facilitate this operation, a simple instrument has been contrived by my friend Dr. T. Davies, by which the operation is rendered almost as trifling as mere acu-puncture. The instru-

Experi-
mental
opening of
the pleura.

Dr. Davies's
instrument.

ment consists in a needle-pointed stilet, which, gradually increasing in size, becomes, in its thickest part, as large as a crow-quill. A groove is made on one side, something like that of a director, which, when the instrument is introduced, allows the escape of the fluid from the cavity. Although it is extremely probable, were the operation of tapping the chest more frequently performed at an early stage of pleuritic effusion, that the proportion of successful cases might be greatly increased, yet I am not inclined to encourage the frequent resort to this mode of treatment; since it is certain, that very large collections of fluid may be removed by the natural process of absorption. Where the product of inflammation has been of the most plastic kind, this result does perhaps invariably occur; and even where the serous effusion had been of a sero-purulent character, the total removal of the fluid part, and the shutting up of the concrete residuum, leaves the chest so free from active disease, that it is very doubtful if a better result could have been obtained by tapping.

The fluid collected in the bag of the pleura, in empyema, sometimes finds an exit by a communication formed between the cavity in which it is contained and the bronchial tubes. In these cases, there generally takes place a sudden and copious puriform expectoration, often of the most offensive description. If not immediately fatal by the mechanical production of suffocation, this occurrence generally alleviates the sufferings of the patient. The relief, however, is only temporary;—the fluid in the pleura is very partially evacuated;—the quantity discharged is soon replaced;—the sufferings of the patient recur, to be again relieved by a fresh expectoration. These discharges, with their attendant circumstances, are usually repeated, at longer or shorter intervals, until the patient is cut off, either worn out or suffocated; but, in some rare and fortunate cases, the expectoration gradually diminishes, and health and strength return. Examples of communication formed between puriform effusions in the

Opening of
empyema
into the
bronchi.

Case of
empyema
opening
into the
bronchi.

*possible a Pleurisy
of a similar case.*

pleura and the bronchi are related by Laennec and Andral, and probably by many other authors. I saw one, if not more cases of this description, in the Clinical Ward in Edinburgh; and my friend Dr. Foville of Rouen has communicated to me some of the details of an interesting case of this kind which occurred in his practice. A man, about forty-two years of age, above the middle stature, with rather a predominant developement of the chest and upper extremities, possessed of strong respiratory organs, giving him the power of long-continued and rapid running without becoming out of breath, and habitually enjoying excellent health, was attacked, in March 1826, with a trying pain in the left shoulder. It was regarded as rheumatic by the medical man who then saw him, and soon gave way to the use of baths. A difficulty of respiration, however, remained. A dry cough recurred every morning and evening, unaccompanied by pain, but there was a general and fatiguing lassitude and uneasiness. These symptoms continued to increase; the cough, in particular, became more frequent and troublesome. One day, after a very obstinate fit of coughing, there took place a sudden and abundant expectoration of thick, yellow, and very offensive matter. This was followed by some relief to the patient, and no similar expectoration took place for several days; after which, it again occurred, preceded by another obstinate fit of coughing, and succeeded by fresh alleviation. A few more days elapsed, and were followed by a repetition of the same occurrences: in fact, similar fits of coughing and expectoration continued to recur, at intervals of seven or eight days, for about a month. It was at this time, two months from the commencement of the attack, that Dr. Foville first saw him. The patient then reclined on his right side—the respiration was very difficult, especially when the slightest movement was attempted—the lips were of a deep red, and the eye-lids somewhat livid or blue—the pulse was feeble and rapid, with an intermission between every third or fourth beat

(this irregularity, however, was ascertained to have existed ten or twelve years)—the hands were cool and clammy, but the left was sensibly cooler than the right—the left side of the face was likewise paler and cooler than the right—the left side of the chest afforded a dull sound on percussion, and no respiration could be heard with the stethoscope, except at the upper part, and there very equivocally. The ribs on this side partook of the movements of respiration less than on the right side, which was generally resonant on percussion, and the sound of natural respiration was audible by the stethoscope. The abdomen was distended. The patient experienced neither appetite nor thirst; and the little drink which he took seemed to remain several hours, or even days, in the stomach. The bowels were constipated, and the urine very scanty and loaded. These symptoms were accompanied by little or no emaciation, notwithstanding the almost total abstinence of the patient. A seton was inserted in the side, but it was long before it produced any discharge, and then only to a very slight degree. It procured no relief; in fact, the respiration became increasingly difficult, but there was no paroxysm of cough or return of expectoration for the space of a month. He was then attacked with a fit of coughing, accompanied by a sudden, abundant, and fetid discharge. A few days afterwards, there was a recurrence of similar circumstances, when Dr. Foville happened to be present. The patient could scarcely breathe. Each effort at inspiration was alternated with a cough for expiration, and the discharge of horribly fetid puriform matter. The paroxysm lasted three-quarters of an hour; when the patient's wife, who was supporting his head and holding the basin, could no longer bear the stench, and was compelled to leave the room. The patient observed this; and, uttering an expression of pity towards her, fell into a syncope, and died in the Doctor's arms. The body was opened the following day. As soon as the history had penetrated the chest, it gave vent to a jet of pus or

sero-purulent matter, eight inches in height. Three large basons were filled with this matter. The lung, compressed, but not otherwise altered in its structure, was carried to the upper part of the cavity. At its lower part, there was an opening, communicating with the bronchial tubes. The sides of the cavity were lined by pseudo-membranous flakes, a number of which had been detached, and were floating in the fluid. Some of these plugged up the opening communicating with the bronchial tubes. The heart was remarkably small: a cartilaginous growth contracted the opening of the aorta. The body had not sensibly wasted since the commencement of the illness.

The almost total suspension of absorption, as evinced by the absence of emaciation, and the loss of appetite both for fluid and solid food, in conjunction with copious effusion into the pleura, seems to be analogous to some of the experiments of Magendie, in which absorption appeared to be suspended by the artificial repletion of vessels or visceral cavities.

The communication between pleuritic effusions, and the air-passages of which I am speaking, produces the most frequent form of pneumothorax. It is in these cases that we sometimes find that decided evidence of the presence of fluid, which is afforded by distinct fluctuation, and even by a splash, when the chest of the patient is shaken. We have likewise, in these cases of pneumothorax, accompanied by effusion, that remarkable and peculiar stethoscopic symptom, called 'metallic tinnitus,' in which the voice and the cough of the patient sound as if they were produced within a brazen vessel. Pneumothorax is, however, sometimes produced by the exhalation of gas from the decomposing sero-purulent effusion, without there existing any communication with the air-tubes; but in this case, though we may have the distant fluctuation and splash, there is no metallic tinnitus. For the production of this symptom, it is essential that there should be not only a large cavity containing

Metallic
tinkling—
under what
circum-
stances
heard.

both air and a liquid, but there must likewise be a communication between this cavity and the air-tube. Hence we have the metallic tinnitus, both in the form of pneumothorax, of which I first spoke, and also in those cases of phthisis in which a very large portion of the lung is excavated.

The stethoscope affords the most valuable assistance in the diagnosis of cases of pneumothorax. Since the method of percussion recommended by Avenbrugger will, if the quantity of air in the chest is considerable, procure as great a degree of resonance as from a healthy chest, it is obvious that this method of examination, employed singly, will expose us to considerable chance of error. If the dilatation of the chest have not been considerable, or if subsequent contraction have removed it, the measurement of the chest will not throw any light on the case. The mode in which the patient reclines may likewise be fallacious. The early stage of the affection may, and often has been, either mistaken or overlooked; or, should this not have happened, the practitioner to whom the patient presents himself, when the malady has assumed the precise form of which I am speaking, may not be made acquainted with the exact history of the case. Again; if, from any accidental combination of circumstances, the side of the chest, on which the pneumothorax does not exist, happen to afford a dull sound on percussion, from being œdematous, or from old pleuritis, or any similar cause, the more healthy side of the chest may, without the aid of the stethoscope, be mistaken for the diseased one. A fatal instance of this kind occurred, some years since, in the neighbourhood of Edinburgh. A gentleman was supposed to be labouring under hydrothorax, or empyema, and it was determined to perform the operation of tapping for his relief. The patient, who at the time was not confined to bed, rode out to see some of his neighbours, from whom he was expecting to be detained some days by the confinement following the tapping. His

Utility of the stethoscope in pneumothorax; and fallacy of percussion alone.

visit proved a last farewell; for the affected side having been mistaken, from one of the causes I have mentioned, the trochar had no sooner penetrated the sound side of the chest, than the air rushed in, and, depriving him of his only means for carrying on the function of respiration, extinguished life immediately. Had the stethoscope been employed, the resonance of the chest could not have been attributed to the healthy state of the lung; because the sound of respiration would necessarily have been wanting, and the dulness of sound on the healthy side could not have been attributed to the presence of fluid, because respiration would have been heard, and would, in all probability, have been even puerile.

It sometimes happens, that the communication between the bronchial tubes and the pleuritic effusion co-exists with external openings. In these cases, when injections have been employed for the purpose of promoting the closure of the fistulous external opening, their taste has been perceived in the mouth. Several instances of this kind are cited by Dr. Young.

Before quitting the subject of pneumothorax, I may just mention a third form, neither dependent on a communication between the bronchi and the pleura, nor on the decomposition of the effusion. It is supposed to arise from the secretion of air by the pleura itself. Such an occurrence is undoubtedly rare; but the cadaveric production of gas, which in some states of the body takes place very shortly after death, may easily be mistaken for it.

Worm-eaten appearance of pleura.

There is an appearance which deserves particular attention, and is sometimes met with on the pleura and other serous membranes, when inflammation has been of a chronic character, and its product of that mixed description, which, though it never assumes the form of cellular membrane, nevertheless becomes a permanent tissue, having a close, compact, and almost semi-cartilaginous character, resembling what Laennec has described as white non-fibrous tissue.

The peculiar appearance to which I allude, consists in the surface of this dense adventitious structure being rendered uneven by irregular yet rounded depressions, sometimes distinct, sometimes running into each other like confluent small-pox, and presenting an appearance which suggests the idea of the part affected having been worm-eaten. I had been at a loss to explain how this appearance was produced, when my friend Thomas W. King, in one of the inspections which he performed for me, discovered a pleura in a state which threw important light upon the subject, and cleared up the difficulty. In this case, the pleura, thickened by dense semi-cartilaginous deposit, presented the worm-eaten appearance which I have mentioned; but the depressions, instead of being vacant, were filled with a soft, yet concrete inorganizable material, which was not however involved in, or adherent to, the more plastic form of the product of inflammation, as in some cases in which we have seen tuberculous or inorganizable matter shut up in the false membrane: on the contrary, this inorganizable matter was easily removed, leaving a clean and defined margin and surface to the depressions which it had occupied. Hence it would appear, that the worm-eaten appearance of the thickened surface is not produced by ulceration or other destruction of the thickening deposit, but that its deposition or formation had been prevented by the presence of a different material. This process bears some resemblance to that employed by aquatintors, to limit the adhesion of the varnish which they apply to those parts of their plates which they wish to protect from acid, and to leave as lights in the picture.

Mode of its
production.

In the cases which we have been hitherto considering, the inflammation extends itself over the whole, or far greater part, of the surface of the pleura; those parts almost alone escaping, which have been more or less closely united by old previous inflammation. I must not wholly pass over those pleurisies which are more partial. I believe that they

Partial
pleurisies.

are rarely primary; but owe their origin to some local cause, which may either be, accidental external violence, as the fracture of a rib, or some pre-existing disease. This pre-existing disease may either have its seat behind the pleura pulmonalis, as in inflammation of the substance of the lung and the developement of tubercles, or behind the reflected pleura; as when an abscess of the liver makes its way into the chest, and, by the aid of the partial pleuritic adhesion at the base of the lung, finds a communication with the bronchial tubes, without invading the cavity of the pleura. Laennec remarks, that these partial pleurisies—which may be called ‘dry pleurisies,’ in contradistinction to those which are accompanied by abundant sero-purulent effusion—are generally trivial complications of affections of much more importance; and that, often, neither the medical attendant, nor the patient, perceives any well-marked symptom dependent on them.

Dry pleurisies—con-
founded
with pleu-
ritis follow-
ed by ab-
sorption of
the effusion,
or,

I have already mentioned the term ‘dry pleurisies’; and remarked, that too much had been made of them; stating that a pleurisy without fluid effusion is extremely rare. Laennec says, that, within a few years, much needless importance has been attributed to dry pleurisies, in different new works, periodical publications, and theses published by the pupils of the School of Paris. He very much doubts the existence of pleurisies in which there is a simple secretion of a false membrane unaccompanied by the simultaneous exhalation of a serous liquid. He thinks that most of these supposed cases may be reduced to two forms:—the first, in which the serosity has been completely absorbed before death; and the second, in which the consolidation of the pulmonary structure has afforded an obstacle to the production of the effusion. He considers that the obstacle is mechanical. As to the first form, after adverting to the rapidity with which absorption takes place under certain circumstances, Laennec informs us, on the authority of Dr. Guersent, the physician to a large hospital for children,

that the examples of coagulable effusion in the form of a false membrane, unaccompanied by a notable quantity of fluid effusion, are much more frequently met with in the pleura of young subjects than in those of adults. Laennec ascribes this fact to the greater facility with which absorption takes place in childhood. In the second form, or that in which the inflammation of the pleura takes place in conjunction with induration of the lung from inflammation, there is probably, as Laennec believed, not only a small and scanty effusion of fluid, but also an increased absorption favoured by compression. Whatever be the explanation we may choose to adopt, there can be no doubt respecting the fact, that, in this complication, the pleurisy is often partial, corresponding to the hepatized portion of the lung; and that the proportion which the fluid bears to the concrete part of the effusion is often very small. The author whose opinion I have been giving, regards this complication as tending to diminish the intensity of the inflammation in both structures. He considers the partial pleurisy accompanying phthisis, when a portion of the lung is indurated by the presence of tubercles, as apparently unaccompanied by fluid effusion, from the same cause which operates in pleuro-pneumonia. Nevertheless, in some of those cases in which traces of pleuritic inflammation accompanying tubercles are limited, he thinks that the affection has been chronic, and the exudation of coagulable matter unaccompanied by any fluid effusion.

with pleuritis accompanied by indurated lung.

Some cases of partial pleurisies are more closely allied to those which are general; since, instead of depending on any peculiarity in their exciting cause, they are limited by old adhesions, which, uniting the greater part of the pleural surfaces, leave but a small portion exposed to a recurrence of inflammatory effusion. When I before alluded to these adhesions, in connection with recent pleurisy, I only spoke of those cases in which the adhesion had united a comparatively small part of the surface of the pleura. In the cases

Pleuritis limited by old adhesions.

now contemplated, the serous surface remaining unattached bears but a small proportion to the extent of surface from which the effusion is excluded. When an attack of pleurisy has had the effect of uniting the pleura pulmonalis to the pleura costalis, it frequently happens that a well-organized layer of adventitious cellular membrane connects the opposite edges of the lobes of the lungs, and shuts up the interlobular fissure, which, in such cases, does not appear in the least to participate in the inflammation. But, though it thus escapes at one time, it may be attacked by inflammation at a subsequent period: hence the interlobular fissures afford some of the most remarkable examples of the form of partial pleurisy of which I am now speaking. Bayle, it is believed, was the first morbid anatomist who particularly pointed them out. The effusion which takes place in these fissures is shut up, and, as it were, incysted, and can never become very abundant. The cavity which it occupies is gained at the expense of the lung, which is compressed, so as, in some cases, to appear excavated. The effusion, when not of the plastic form, presents more completely the characters of pus than the generality of pleuritic effusions; and affords a good illustration of the remarks which I offered, when speaking of pus, and of the products of inflammation resembling it. These collections, resulting from the circumscribed inflammations of the interlobular fissures, might readily be taken for abscesses in the substance of the lung; a mistake which has probably had some share in leading to the commonly-received opinion, that pneumonia often terminates in abscess—an event which is, in reality, of very rare occurrence.

Partial inflammations are sometimes produced between the base of the lungs and the diaphragm, precisely in the same manner as they take place between the lobes of the lungs;—that is to say, the space which they occupy has been shut up by previous old adhesions along the edge of the lower lobes of the lungs. It would seem, however,

that it is not absolutely necessary that previous adhesions should, in these cases, exist, to arrest the extension of the inflammation. The circumstance of the abrupt change in the direction of the membrane seems itself to have considerable influence in producing this effect: at least, this appears to me to be the readiest explanation that I can offer, of the occasional occurrence of cases in which inflammation has been set up between the base of the lung and the diaphragm, without extending itself to the sides of the chest, although there were no previous adhesions to prescribe the limits. It is highly probable, that to this same cause we must attribute the frequent escape of the interlobular fissures, under those attacks of inflammation which affect almost every other part of the pleura. The limitation of the sanguineous effusion in some cases of apoplexy is perhaps analogous to these limitations of pleurisy.

The inflammation of the pleura between the base of the lungs and the diaphragm is generally accompanied by symptoms which are extremely severe and peculiar, and very often proves fatal. When this is not the case, the contraction of the adventitious layer, to which it gives rise, is sometimes so considerable, as to produce a strongly-marked fold in the diaphragm, with a corresponding depression on the convex surface of the liver.

The inferior, and posterior, or lateral parts of the chest are likewise mentioned as being the seat of partial pleuritis. Indeed, examples of this kind are described by Laennec amongst the most frequent cases of partial pleurisy; but I must confess, that it is not so easy to explain the cause of their limitation, unless they belong to those cases which I have already described as resulting from the inflammation of the substance of the lung.

Concretions are sometimes found loose in the cavity of the pleura. I believe that they are to be ranked amongst the effects of the inflammation of the pleura; since, in structure, they have been found to vary from that of a soft and

Detached
bodies in
the pleura.

tender coagulum, to that of cartilage, fibro-cartilage, or even bone. Laennec says, that when the fluid effused in pleurisy is considerable, there may be sometimes found in it a concrete coagulum of a globular or ovoid figure, and exhibiting no trace of having ever been attached to the pleura; although he seems to think it impossible but that it had at one time such an attachment. Elsewhere, however, he speaks of detached portions of coagulable lymph, approaching to the character of serous tissue, though they did not appear to have been ever attached to the pleura; and he draws an analogy, which I am not prepared to admit, between them and the phænomena which take place in the developement of an egg. I have myself found in the cavity of a pleura, which had evidently been affected with inflammation, a perfectly detached mass of coagulum, of the most plastic form, of considerable firmness, and of a flattened ovoid figure: it was nearly of the colour and size of an egg-plum, but not so thick. Wardrop, in a paragraph which he has added to his edition of Baillie's *Morbid Anatomy*, appears to allude to concretions of the kind of which I am speaking; and is very probably correct, when he compares them to concretions which are occasionally found in the synovial membranes. In the example which he gives, from his own observation, the concretion was not absolutely loose in the cavity of the pleura, but was attached by a few thin membranous bands: it was composed of concentric layers of fibro-cartilaginous structure, upon a nucleus of bone. I have likewise seen one or more cartilaginous bodies which were all but detached, being merely adherent to the pleura by a slender and delicate film, which seemed much more like a secondary formation, than the medium through which the cartilaginous body had been formed and nourished. In another instance, the cartilaginous body presented a corrugated and uneven surface, somewhat like that of a mulberry calculus from the urinary bladder. This, as I have already stated in my preliminary Lecture on the serous membranes, may be attri-

buted to the contraction of the interior, after the surface had become consolidated.

You will probably recollect, that, in my general observations upon the inflammation of the serous membranes, I remarked, that the effusion of the most plastic form separates into concrete and fluid parts, without the former being necessarily adherent, or even applied, to the surface of the serous membrane; although the tender film which it forms, is more or less moulded to the figure of the membrane. It is however difficult to conceive the possibility of these productions passing into the state of a permanent tissue, until they have established a connexion with the surrounding living parts; and I must confess my inability to explain the process by which these loose masses of coagulum arrive at the ultimate stage of cartilage or bone. At the same time, I think that there are various reasons for believing that some important part of the function of nutrition is carried on, independently of the vessels, by a process resembling endosmosis and exosmosis. The substance of the loose bodies of which I have just spoken is manifestly a very imperfect tissue, and doubtless owes its persistence to the peculiarity of its situation.

Although fluid effusions of an inflammatory character are by no means infrequent in the cavities of the pleura, those of an atonic description, except as they occur a very short time before death, are much less frequent than is generally imagined. I have often observed, that the symptoms which were supposed to indicate hydrothorax were merely dependent on a bronchial affection. In this observation I am fully borne out by Laennec; who says, that water in the chest, which is regarded by the public, and even by many practitioners, as a very common disease and a frequent cause of death, is really very rare. He does not think that idiopathic hydrothorax, to an extent capable of causing death, can be established in a larger proportion than one in two thousand cases. But, he informs us, he has heard medical

Atonic
hydrotho-
rax—rarely
met with.

men who were not much acquainted with morbid anatomy, and who were consequently very weak in their diagnosis, style as hydrothorax, cases of hypertrophy of the heart, of aneurism of the aorta, or of phthisis, with some little irregularity in the symptoms, and even cases of cancer of the stomach, and of induration of the liver. I have repeatedly seen the same mistake with respect to bronchial affections; and inflammatory effusions into the pleura have also been mistaken for hydrothorax.

Idiopathic hydrothorax—commonly unilateral.

When idiopathic hydrothorax does exist, it is generally confined to one side. The serous membrane preserves its healthy appearance, and merely contains an accumulation of clear serum. The lung is compressed, flaccid, and deprived of air; and when the effusion is very considerable, the affected side is sensibly dilated. Laennec has seen a hydropic collection in the chest sufficiently copious to produce this effect without the concurrence of anasarca, or of effusion into any other serous membrane; and without the existence of any organic derangement of the viscera, to which it could be attributed.

Symptomatic hydrothorax—almost confined to the moribund.

Symptomatic hydrothorax is as common as the idiopathic form is rare. It is almost equally liable to accompany all diseases, whether acute or chronic, general or local; and its appearance is usually the token of a speedy and fatal termination. Sometimes it takes place a very short time, a few instants, before death: and it is rare for the symptoms which denote its existence, and which are similar to those of the idiopathic form, to present themselves more than a few days, or even hours, before death. It is extremely uncommon for the signs of hydrothorax, even in cases of organic diseases of the heart attended with ascites and general anasarca, to have made their appearance so long as a week before death. Symptomatic hydrothorax may, then, be regarded as an affection almost peculiar to those who are in the agonies of death. The fluid effused is often clear and colourless; but it is sometimes yellow, and at others sanguinolent.

When it exists on both sides, it tends to render the last moments painful, from suffocation. Yet we sometimes find a considerable effusion on both sides, when the dyspnœa preceding death had not been very remarkable. In these last-mentioned cases, Laennec thinks that the effusion took place almost at the moment of death, or within the first few moments after that event. He has seen upwards of a pint of serum in the pleura, when, a quarter of an hour before death, there had been no symptoms of its presence: and, on the other hand, he has repeatedly observed, that there was scarcely an ounce or two of serum in the chest, although distinct œgophony was heard a short time before. "In the one case," he asks, "have not the exhalants—and in the other, the absorbents—been in action during the agony, or immediately after it?" These are questions which I am not able to decide; but they shew the importance of being well acquainted with the appearance of the lungs and pleuræ after long exposure to effusion. The state of the lung affords, perhaps, the best means of distinguishing these recent cases of hydrothorax, from those which have been of longer standing. The pulmonary tissue is less compressed, still contains some portion of air, and wants the appearance of maceration; which is very evident, when the effusion has been of long standing.

I have already mentioned, that the product of inflammation of the pleura is at times mixed with blood. Blood may be found in the pleura from other causes, and to a much greater extent: it may occur by a species of exudation in purpura hæmorrhagica, from a state of the system allied to scorbutus, when it is probably confounded with one form of pulmonary apoplexy. The bursting of aneurisms is perhaps the most frequent cause of the effusion of blood into the pleura: and it may likewise occur from wounds in the chest, in which the intercostal or mammary artery has been implicated. I have seen a copious effusion of blood behind the pleura costalis, which was extensively detached

Blood in the
pleuræ.

in consequence of rupture of the aorta, independently of aneurism. The vessel, which was much diseased, had suffered a kind of splitting or lamellar separation of its parietes, which had probably allowed the somewhat gradual escape of blood; since the patient survived several hours from the time of seizure, which appeared to be spontaneous, and independent of external injury.

Attached
surface of
pleura—
effects of in-
flammation.

I shall now proceed to speak of the attached surface of the pleura. The effects of inflammation on this surface are sometimes found in the form of serous effusion, producing œdema: at other times, the effusion is of the plastic character, in which case its limits are generally defined: and not unfrequently, it is inorganizable, and assumes the form of a nearly concrete pus. The attached surface of the pleura pulmonalis is very rarely the seat of morbid appearances. There is, however, sometimes a partial deposit, producing a slight thickening of a nearly opaque white colour, in some instances accompanied with a little puckering. The polished surface of the pleura at these spots is often quite natural; yet the occasional occurrence of a slight adhesion to the opposite surface of pleura costalis must, I think, be allowed to indicate their inflammatory origin. The existence of tubercles in the substance of the lungs is probably the most frequent exciting cause of inflammation on the attached surface of the pleura pulmonalis: and I believe that the thickening of the pleura, which we often find at the summit of a tuberculous lung, has generally commenced in this form; although the adhesions which are so often found between this part and the parietes evince that the polished surfaces may also become affected.

Ossification
behind the
costal
pleura.

On the attached surface of the pleura covering the parietes, inflammation leads to the œdematous, plastic, and puriform effusions which I have enumerated; and cartilaginous and even bony deposits are sometimes the ultimate result of its action. When bone is formed behind the pleura costalis, it is generally in the form of thin plates; and

Dr. Baillie said that he had never seen it in any other. In a specimen which I took from an old man who died in this hospital, there was not merely a plate of bone nearly half encircling the chest, but also a considerable mass of the same substance. In another case, in which there was a very extensive plate of bone behind the pleura costalis, on the right side, this was the only circumstance met with to account for the liver, which was not remarkably large, having been felt very distinctly, and unusually low, in the right hypochondrium.

Circumscribed cysts, containing earthy matter, are sometimes found behind this portion of the pleura: they are probably the result of inflammation of limited extent, which had led to the formation of deposits of a purulent or inorganizable character. I have seen a cyst, which appeared to be of this nature, filled with small white earthy grains, resembling comfits.

Gangrene of the pleura is an extremely rare occurrence: it hardly ever takes place, except in conjunction with gangrene of the lung; and in these cases it is generally confined to a small space, nearly correspondent to the affected portion of lung. In a case which occurred in this hospital, the extent of gangrene was very considerable; and though accompanied by gangrene of the lung, it did not appear that this was the sole cause. The inflammation of the cellular membrane on the attached surface had probably contributed to the production of sphacelus.

Gangrene
of the
pleura.

The pleura covering that part of the diaphragm on the left side which is opposed to the cardiac extremity of the stomach is sometimes destroyed by a process which, if it be not strictly cadaveric, seems to be more allied to gangrene than to ulceration; and appears to be the effect of the chemical action of the secretion of the stomach, the coats of which are found perforated at this part.

The attached surfaces both of the pleura pulmonalis and costalis are liable to become the seat of accidental produc-

Scrofulous
deposits
beneath the
pleura.

tions; such as, the scrofulous, the cancerous, the fungoid, &c. Though I believe that it is generally on this surface of the pleura that the productions of which I have now to speak are formed, I must state, that some able pathologists, amongst whom I cannot mention a higher authority than that of Laennec, consider that it is in the substance of the serous membrane itself, and also on the polished surface, as well as on the adherent surface, that the accidental tissues are sometimes developed. I shall not at present take up your time with the examination of this question. With respect to the scrofulous productions to which the term 'tubercle' is at times restricted, I am ready to grant that they may be formed in all these situations, and perhaps, even most frequently, in or under the false membrane attached to the surface of the pleura. I have seen small tubercles, regarded as scrofulous, producing numerous elevations of the pleura behind which they seemed to have been formed; but I am ignorant of the symptoms which attended them. In a case of pleurisy of rather a chronic character and attended with little if any pain, in a very much debilitated subject who had long been labouring under rheumatism, there was abundant fluid effusion; and the thin and nearly opaque false membrane which lined the cavity was very closely sprinkled with small opaque miliary tubercles, which appeared to be situated on the membrane itself. They were probably of a scrofulous character; since miliary tubercles were found in the compressed lung of the same side. Tubercles of this description, thickly set, have been mistaken for thickening of the pleura itself.

Malignant
disease af-
fecting
pleura.

In speaking of deposits of tubercles of a cancerous or malignant character affecting the pleura, I shall not enter into the consideration of the distinctions which it has been attempted to draw between the accidental productions of this class; as the nature and structure of these formations will be made the subject of some of our earliest succeeding Lectures. In persons who have died with decidedly can-

cerous affections of the mamma or other parts of the body, it is by no means uncommon to find a few very small firm tubercles sprinkled immediately under the surface of the pleura pulmonalis; this membrane, and the lungs themselves, seeming in other respects to be perfectly healthy. In such cases, these small tubercles are often found in greater numbers beneath the pleura covering the parietes. When the affection by which the constitution is contaminated is of the character denominated 'fungoid,' the tubercles are frequently larger, and more prominent.

In a case in which the peritoneum was nearly covered with large tumors and tubercles, regarded as fungoid and accompanied with copious fluid effusion, a short double row of small tumors of the same character was found on the pleura, in the course of two of the intercostal arteries. Haller and Laennec speak of fungoid and melanoid deposits to a considerable extent having been found in the cavities of the pleura, on their smooth unattached surfaces. I have never seen any thing of the kind, and am therefore incompetent to speak of them.

Cruveilhier has given a case of two large tumors occasioned, as it would appear, by hydatid cysts, and situated behind the pleura costalis, one on each side. They were of sufficient size greatly to compress the lungs and impede respiration. In a specimen presented to Guy's Museum by my friend E. C. May of Tottenham, a large cyst, containing acephalocyst hydatids, is situated in part beneath the close pericardium about the base of the heart, and partly under the pleura pulmonalis, at the root and summit of the right lung. I have found a cyst containing similar hydatids beneath the pleura pulmonalis of the kangaroo.

Hydatids
beneath the
pleura.

LECTURE VI.

ON THE SEROUS MEMBRANES.

THE PERITONEUM.

DEFICIENCY OF THE PERITONEUM, CONGENITAL OR ACQUIRED.—EXCESS —
 ALTERED SECRETION—EFFECTS OF INFLAMMATION—ON THE FORMATION OF
 FALSE PARIETES, WITH CASE ILLUSTRATIVE OF THIS REMARKABLE APPEAR-
 ANCE—UNIVERSAL ADHESIONS OF PERITONEUM — PURULENT COLLECTIONS.
 —ADMIXTURE OF PLASTIC AND NON-PLASTIC MATTER—PERFORATION OF IN-
 TESTINES, WITH ILLUSTRATIVE CASE — TUBERCULATED ACCRETIONS OF THE
 PERITONEUM, NOTICED BY DR. BARRON — LOUIS'S OPINION, THAT CHRONIC
 PERITONITIS IS ALWAYS TUBERCULAR—CREPITATION PRODUCED BY PERI-
 TONEAL ADHESIONS—NON-PLASTIC PRODUCTS OF INFLAMMATION—GENE-
 RAL CONTRACTION ACCOMPANYING THE EFFUSION OF SERUM—CASE ILLUS-
 TRATIVE OF THIS CONTRACTION—PARTIAL INFLAMMATIONS OF PERITONEUM
 —LOCALITIES MOST FREQUENTLY AFFECTED—COMMENTS ON THE SEROUS
 GASTRITIS OF NOSOLOGISTS—SEMI-CARTILAGINOUS PATCHES ON THE PE-
 RITONEUM — SCABROUS APPEARANCE — DETACHED BODIES IN THE PERI-
 TONEAL CAVITY—ASCITES—BLOODY SPOTS — ATTACHED SURFACE OF THE
 PERITONEUM — OEDEMA OF THE SUB-PERITONEAL CELLULAR TISSUE —
 VESICLES AND SEROUS CYSTS FORMED BENEATH THE FREE SURFACE—EF-
 FECTS OF INFLAMMATION ON THE SUB-SEROUS CELLULAR TISSUE—PLASTIC
 AND NON-PLASTIC EFFUSIONS—LACERABILITY OF SUB-SEROUS AND SUB-
 MUCOUS CELLULAR MEMBRANE—CASE IN EXPLANATION OF THIS PHENOME-
 NON—SCROFULOUS AND MALIGNANT DEPOSITS BENEATH THE PERITONEUM
 —CASE OF MALIGNANT DISEASE OF PERITONEUM—HYDATID GROWTHS—
 MORBID ANATOMY OF THE TUNICA VAGINALIS—RESULTS OF INFLAMMATION
 —HYDROCELE—HEMATOCELE—APPEARANCES ON THE ATTACHED SURFACE
 —HETEROLOGUE DEPOSITS—SYNOVIAL CAPSULES, BURSÆ MUCOSÆ, &c.—
 LOOSE BODIES WITHIN SYNOVIAL CAPSULES.

GENTLEMEN,

EXAMPLES of the original deficiency of a part of the peri-
 toneum are very uncommon. The only forms in which
 I have noticed such a preternatural appearance, are, in
 fetuses formed with a deficiency of a more or less consi-
 derable part of the anterior parietes of the abdomen; and
 in those cases of imperforate anus which depend on the
 intestines terminating at some distance above this part in a

Deficiency
 —congeni-
 tal.

blind extremity. In this latter case, the deficiency of part of the intestine is of course attended with a want of the corresponding part of the peritoneum.

Acquired deficiencies of this membrane are more often apparent than real. The preternatural shortness of the mesentery, and the almost total disappearance of the omentum, depend on the contraction, rather than on the absence of parts. They are to be regarded as amongst the results of inflammation, and will be considered under that head. We have, however, instances of the loss of a portion of peritoneum in those cases in which a strangulated piece of omentum is excised from a hernial sac. Deficiency
—acquired.

The examples of a redundancy of peritoneum are not so uncommon. They may be of original formation; as when a portion of intestine, which in most cases is bound down to the parietes, has a more loose connection, by means of a fold of peritoneum in the form of mesentery, meso-colon, or meso-rectum; or where the omentum is of unusually large size. The peritoneum exhibits an acquired increase of size or extent from effusions into its cavity—from the development of tumors—and in the different varieties of hernia; in which we have not only the extension of the membrane into a new process forming the sac, but the portions of peritoneum supporting the protruded viscera are also extended, and occasionally cysts of large size are formed within the hernial sac. Excess.

The secretion from the surface of the peritoneum is, like that of the other serous membranes, liable to various alterations. It is sometimes deficient, leaving the membrane nearly or quite dry. This is occasionally seen, to a limited and partial extent, upon or near portions of intestine distended with gas. It may, I believe, in most of these cases, be regarded as cadaveric; yet it is by no means improbable, that something of this kind may take place during life, and that it is a precursor to inflammation. The secretion is sometimes greatly increased, constituting ascites, of Altered secretion.

which I shall speak hereafter. It may also be changed in quality; and become viscid and mucous, or tinged with blood or bile.

Effects of
inflammation.

The smooth surface of the peritoneum, under inflammation, exhibits, in a well-marked manner, the different varieties of the plastic and puriform effusions to which I have already so repeatedly directed your attention. Layers and bridles of adhesion, and pouches or cysts of various forms, afford the best specimens of the most perfectly plastic form of inflammation occurring in the peritoneum. In its general characters, the production of such false membranes is in strict accordance with the description which I have given in my general remarks.

Formation
of false
parietes.

When the coagulable matter, in a more or less plastic form, exists in large quantity, it often exhibits a peculiarity, which, though it well merits attention, I have not seen particularly described by any author. Whilst it firmly unites the intestines, and dips in between their convolutions, it presents an even surface to the parietes, and remains unattached to them, except at the margin of the layer formed by the adventitious deposit. In this way, a new shut cavity is formed, which is probably not only occasioned by, but also facilitates, the movements of the abdominal muscles. I believe that I cannot better illustrate this fact, than by reading to you an extract from the rough notes which I made of the first case in which I observed this peculiarity. I have since seen it in several other instances.

Case.

“A young man, a patient in La Charité, during the season of 1821-2, had been long ill, and was extremely emaciated. His complaint had been peritonitis, which had terminated in effusion. Some time before death, paracentesis had been proposed; but this was objected to, and liniments were employed. The effusion was to a great degree absorbed; and when the body was placed on the table, it had not at all the appearance of being distended. For a considerable time, diarrhœa had been very urgent, disturbing

the patient sometimes thirty times in the course of the day. In opening the abdomen, the lower part was the first cut into. A fluid escaped, opaque, and of a light-brown colour, very much resembling yeast diffused through water. On raising the parietes, an extended mass, of the same colour as the fluid mentioned above, concealed every thing from view. It appeared to be evidently a new production, and not a degeneration of the omentum; although its not extending higher than the arch of the colon might favour such an idea. Its under surface was smooth, like a serous membrane; but it appeared perfectly detached. The upper surface was rough, and, on this side, the mass very much resembled a coagulum of milk curdled by treacle. The edges were ragged, and indeterminate, with many flocculi of the same matter floating about in the fluid, which appeared to owe its colour to minute particles of this substance diffused through it. When these matters were removed, the intestines continued concealed from the arch of the colon, to which the abdominal muscles adhered throughout, down to the pubes. They were covered by false parietes, opaque and smoothly extended, so as to hide even the form of their convolutions. There was thus formed an adventitious shut sac, occupying by far the greater portion of the anterior part of the abdomen, into which none of the viscera penetrated, but which contained merely the fluid and the singular mass above described. On cutting into the layer which covered the intestines, it was impossible to say whether it was the omentum altered by the disease, or entirely a new production: there was, however, nothing else which could be considered as the vestige of the omentum." I had not at this time particularly noticed the contraction and almost total disappearance of the omentum in cases of peritonitis which have been accompanied by copious effusion, but of this I shall speak hereafter. "The intestines were implicated in numerous and strong adhesions; and a vast number of tubercles, some of considerable

*see the pustular form of false membrane
in Peritonitis - Broussais V. 2 - P. 327.*

size, were scattered under the peritoneal coat. The mucous membrane of the colon was reddened throughout a considerable part of its course."

Conditions
essential
to the for-
mation of
false pa-
rietes.

It seems to be essential to this result of peritonitis, that there should be a considerable quantity of the coagulable matter effused at once. Where it is in smaller quantity, forming bridles of greater or less thickness and extent, these bridles are not merely found passing from convolution to convolution, but they also become attached to the parietes. This difference between the two cases is well worthy of attention. Were the extensive surface, which the false membrane presents in the one case, to become adherent to the parietes, their motion, so essential to the function of respiration, would be materially interfered with. In the other case, this effect is not to be apprehended from the partial adhesions in the form of bridles.

Universal
matting to-
gether of
intestines
and pa-
rietes.

Cases however do occur, in which we find the convolutions of the intestines not only united and matted together, but firmly and generally adherent to the parietes. Such cases I have principally met with amongst children of a scrofulous constitution; and their illnesses, which had been lingering and tedious, had not commenced by a well-marked attack of peritonitis. A part of the product of inflammation in these cases, though concrete and translucent, is short and fragile, without appearance of organization; and frequently sprinkled with numerous masses of tuberculous matter. There may, however, be some films of a more decidedly membranous or plastic character; since, as I expressly noticed in my general remarks, the successive attacks of inflammation of a serous membrane, in which resolution does not take place, do not give rise to the same products in each. In these cases, it is by no means unfrequent to find the intestine perforated by ulceration, which sometimes forms communications between contiguous convolutions. Such ulcerations are favoured, not only by the collections of tubercular matter implicated in the false mem-

brane, but by depositions of the same description beneath the peritoneal coat. Artificial anus is sometimes produced by such ulceration; making a communication between the intestine and the parietes, instead of between two contiguous convolutions.

It is in the abdomen that we particularly notice those collections of coagulable matter which I have described as becoming organized externally; whilst internally, in consequence of this process not being set up, puriform collections are formed. These collections, which vary in size from that of a pea to that of an orange, take place in those situations in which the concrete part of the inflammatory effusion is most considerable: hence they are most frequently met with in the lateral and angular parts of the abdomen, between the convolutions, and along the thicker edges of false membranes. They may be formed in cases in which the peritonitis appears to have been productive of an effusion, at first, of a very plastic character. These purulent collections are attended with ulcerative absorption; first, of that part of the serous membrane with which they are in contact, and afterwards of the parts subjacent to it. Now, if any accident tear through the feebly-organized exterior of the matter uniting the convolutions between which such collections exist, we have an opening into the intestine, formed from without, inwards, and effecting a communication between the purulent collection and the intestinal canal. A very illustrative case occurred in a female who was attacked with peritonitis towards the latter period of pregnancy. Premature labour, which took place some time after the attack, led to her death; and the following appearances presented themselves, on inspection:

Shut-up
collections
of pus.

Case of
Harriet
Poltore,
examined
the 25th of
1st month
(January)
1827.

The body was still warm. The cutis over the abdomen was remarkably brown. Emaciation was considerable. The head was not opened. The contents of the chest were generally healthy: there was merely a little pleuritic adhesion, not recent, at the upper part of the right lung, and also some at

its base. In opening the abdomen, between the umbilicus and pubes, the scalpel entered a cavity occupying almost the entire pelvis. It was about half filled with fæculent matter, which had escaped from the intestines. The intestines were prevented from falling into the pelvis by the false membrane which formed the walls of this cavity, and restrained its contents from invading the other parts of the abdomen. There were numerous small ulcerated openings in the upper part of the cavity, which communicated with the interior of the small intestines, especially with the last part of the small intestine, which, firmly united by adhesions, contributed chiefly to form the parietes of the cavity at this part. There was a much larger opening quite at the lower part of the colon, just above the promontory of the sacrum. There were also two considerable cavities, behind the peritoneum, in the pelvis; the larger, anterior; the other, posterior, and to the left. They contained fluid fæculent matter, and freely communicated with the principal cavity. Although the rest of the abdomen was shut off from that part into which the fæcal matter had escaped, it bore universal marks of peritoneal inflammation. There was no effusion; but general adhesion, which was extremely delicate about the liver and spleen and all the upper part of the cavity, and, throughout the lower part, much more copious, in the form of membranes, and bridles of a blackish or dark grey colour. Between the united convolutions there were a few small circumscribed collections of matter; and one in the left Iliac region, containing about an ounce of pure thick yellow pus.

The mucous membrane of the stomach appeared healthy: that in the pylori-valvular part of the duodenum was reddish, somewhat thickened, and granular. The lower portion was of a bright red, and very vascular. The greater part of the mucous membrane of the small intestines appeared healthy: it contained thick, whitish, viscid mucus: its minute vessels were, in many parts, injected with darkish blood, apparently

from congestion, rather than inflammation. The glandulæ aggregate were, to a very slight degree, thickened; and the minute black points, regularly dispersed over them, evinced the pre-existence of irritation, which had subsided. Nothing like ulceration could be detected in that part of the intestine which did not communicate with the cavity containing pus, and even in the perforated part, the apertures had perfectly clear defined edges. The mucous membrane presented no derangement of texture, and was in many parts quite pale. The large intestine also appeared healthy; but in its lower portion it had rather a leaden hue. The liver and spleen were healthy. The kidneys were of a lighter colour than is quite natural: imbedded near the surface of the left, there were several small transparent cells, containing limpid fluid. The uterus, which formed a part of the bottom of the cavity containing fæces, was but imperfectly contracted, being about twice the size of the unimpregnated state: it was flat, and compressed: its parietes little if at all thickened: its interior, uneven, of a dark colour, and containing dark, grumous, bloody matter. The os uteri was imperfectly closed.

When the coagulable matter which is effused by an inflamed peritoneum, constituting adhesions between the viscera of the abdomen, contains a considerable admixture of inorganizable matter, this latter is often found collected in small masses, having very much the character of tuberculous matter. Sometimes they seem pretty uniformly and thickly diffused through the false membrane, and appear to have constituted a part of it from its very formation. In other cases, the membranes, bands, and bridles, produced by peritonitis with effusion of the most plastic form, are seen to be studded with well-defined, rounded masses of tuberculous matter, of various sizes. In these cases, I apprehend that the process of organization of the false membrane may have been suspended, as in the case of the purulent collections which I have already described. The pro-

Admixture
of plastic
and non-
plastic mat-
ter.

cess of ulceration, however, which the presence of the inorganizable matter produces in these instances, appears to be much less active than is the case with the purulent collections, and more nearly resembles that which we find taking place in the substance of the lungs. The deposit continues to increase; and very often does not pass into the stage of softening until a considerable mass is formed: but when the process of softening has taken place, the coats of the intestines are not unfrequently altered in texture, and are perforated. We have, then, another feature of resemblance between these scrofulous tubercles in the false membrane investing the peritoneum, and the before-mentioned collections of pus.

Andral has related several instances of perforation of the intestines from without inwards, effected by softening of the kind which I have described. The following well-marked case was inspected by myself; and, as I have met with several instances in which appearances of this kind were more or less strongly marked, they must be regarded as constituting a morbid appearance of far from uncommon occurrence.

Case.

A little boy, of nearly five years of age, a patient of Dr. Clark, in Percival Street, Goswell Street, had been habitually subject to costive bowels. He had generally an excessive appetite, which he had been allowed too freely to indulge. He was thin, and his intellect was active and premature. For the last six months he had been constantly ill, obviously labouring under an affection of the abdomen, which was much distended and somewhat tender on pressure, and, toward the latter part of the period, presented partial and tolerably-defined indurations, which did not excite the idea of their being deeply situated.

On examination, the peritoneum was found exhibiting universal adhesions, which were evidently of long standing, and had, for the most part, completely assumed the appearance of cellular membrane, especially about the intestines,

mesentery, and mesocolon. Where this adventitious membrane united the liver and spleen to the parietes, it was more close and dense. The omentum retained its natural position, extending over the convolutions of the intestines, but it was united by adhesions to the intestines, and likewise to the parietes. The intestines were inextricably bound together. The omentum, and also the adventitious membranes constituting these adhesions, were generally of a leaden hue. The latter was thickly sprinkled with collections of a light-coloured inorganized matter of a tuberculous character, and varying in size from that of a millet-seed to that of a chesnut. In some parts where the intestines were glued to each other or to the parietes, the uniting medium, instead of cellular membrane, was a close and compact structure, in considerable quantity, and of very feeble tenacity. Any attempt to separate these adhesions readily opened a way into the intestinal tube. It was one of these adhesions, situated a little to the right of the umbilicus, which had given rise to the principal induration which had been felt during life. The mucous membrane of the stomach and intestines was generally pale and healthy: it was perforated at the spots where some of the last-mentioned adhesions existed, and the margins of these openings were marked by a line of light red. The mesenteric glands were not diseased. The liver and spleen offered nothing remarkable, except the peritoneal adhesions already noticed. The kidneys were rather pale.

This case bears a close resemblance to some of those which are related by Dr. Barron, under the title of ‘Tuberculated secretions of the peritoneum.’ Under this head, the Doctor has obviously drawn together some very dissimilar affections. I shall reserve for another occasion the examination of the views of this pathologist; and, on the present occasion, shall only notice the doubt which he has thrown on the inflammatory nature of several cases in which the viscera of the abdomen, but especially the convo-

Dr. Barron's
tubercu-
lated secre-
tions of the
peritoneum.

lutions of the intestines, were found more or less firmly united together by adventitious matter, either in the form of membranes or bridges, and often conjoined with various tuberculated deposits. It is true, that in many of the cases related by the Doctor, as well as in that of which I have given the details, the symptoms of acute inflammation had not been noticed, rendering it difficult to assign the precise time at which the effusion of coagulable matter had taken place: yet we must remember, that undoubted cases of acute peritonitis are by no means unfrequently occurring, in which pain is wholly, or to a great degree, absent; and that the nature of these cases has consequently been undiscovered. I cannot give a better illustration of the obscurity which sometimes attends these cases of peritonitis, than the following occurrence, which took place in one of the Clinical Schools at Paris. Amongst the patients of a distinguished teacher, was a female, whose case not merely baffled the diagnosis of the pupils appointed to record and watch, but completely puzzled the Professor himself, and induced him to call in to his assistance his distinguished master, Pinel. The diagnosis of peritonitis, which was instantly given by this veteran physician, and which inspection subsequently fully verified, was founded on the peculiar physiognomy of the patient, rather than on any symptoms immediately connected with the abdomen. The absence of pain, then, and of other symptoms of peritonitis, are by no means sufficient to warrant the conclusion that inflammation of this membrane has not existed. On the other hand, the close resemblance to be observed between the adventitious matter constituting the variously-formed adhesions of which we have been speaking, and those which follow the best-marked and most undoubted cases of peritonitis, leave no hesitation in my mind as to the important part which inflammation has acted in the cases in question.

The production of serofulous tubercles, which may be

often witnessed in the substance of false membranes formed on the surface of the peritoneum, is well worthy the attention of those who have attempted to attribute a glandular origin to all scrofulous tubercles, since it appears to be an insurmountable argument against the truth of such a doctrine: for none, I imagine, will venture to contend for the accidental production of a glandular tissue in such membranes.

*See hemorrhagic
Peritonitis. 2V.
Broussais.*

Professor Louis, who has paid much attention to the subject of peritonitis, has observed, that, within the range of his observation, all cases of chronic peritonitis are tubercular. My own inspections would lead me also to the conclusion, that chronic peritonitis is very frequently conjoined with tubercles: yet this concurrence has not been so uniformly supported by cases observed in this country, as it has been by Louis's cases. That form of peritonitis which is accompanied by copious effusion, and which might easily be regarded as ascites, occurs without any appearance of tubercles. The same may be said of other cases, in which the concrete product of inflammation has been more considerable. Since the assertions of Louis have a just claim to importance and respect, from the abundance of valuable evidence by which they are supported, I have thought it necessary to notice the occasional exceptions to his rule with respect to peritonitis, whilst I confirm the frequent occurrence of the combination which he has described.

Chronic peritonitis—
always tubercular?

Scrofulous tubercles of various appearances and different sizes are not the only adventitious productions met with in conjunction with peritonitis. Scirrhus and fungoid masses and tubercles connected with the peritoneum are found accompanied with more or less abundant effusion, and with bridles and films of adhesion, which sufficiently attest the co-existence of chronic inflammation with these growths. In such cases, however, the peritonitis may be regarded as a secondary affection.

Malignant tubercles productive of peritonitis.

Auscultatory signs of peritoneal adhesions.

In whatever mode partial adhesions are brought about, and whether they are connected with adventitious structures or not, their formation appears to be accompanied, at an early stage, by a remarkable symptom, which Dr. Bright has had the merit of pointing out. He describes it, as consisting in a peculiar sensation conveyed to the hand, when pressing the abdomen in a mode calculated to promote motion between the parietes and subjacent parts. He compares it to obscure crepitation from emphysema, and to the effect produced by the bending or flection of new leather. By another gentleman, it has been compared to the effect produced by the friction of a pane of glass with a wetted finger. This symptom appears to be limited to a few days' duration, and seems to depend on a particular state of the product of inflammation shortly after its formation. It also appears to be essential that the effusion should be of that plastic character which is competent to form adhesions. I have not myself had the opportunity of becoming personally acquainted with this interesting and curious phenomenon, and do not fully understand the mode by which it is brought about; but I apprehend that it is perfectly analogous to a symptom observed, in some cases of recent pericarditis, by Collin, who has described it by the same simile as that employed by Dr. Bright. In both of these cases, the recent product of inflammation is subjected to motion with pressure. In the formation of adhesions of the pleura, these two circumstances are not likely to be combined; which may account for the symptom not having been noticed in the pleura, notwithstanding its extreme liability to adhesions.

Non-plastic product of inflammation—in the form of pus;

I must now solicit your attention to those cases in which the inflammatory effusion into the cavity of the peritoneum, instead of merely presenting a partial admixture of inorganizable matter, consists, either wholly or principally, of this substance. Although persons of all ages and descriptions are liable to this form of peritonitis, it appears certain that some individuals are more particularly disposed to it than

others; and it would seem that injury to, and disease of, the pelvic viscera are the most frequent of the exciting causes. It has, I believe, in most cases, been a peritonitis of this kind which has fatally supervened on parturition; and the turbid and whitish, not to say purulent, effusion which has accompanied it, has led to the absurd idea that milk had been transferred from the mammæ to the cavity of the peritoneum. I have repeatedly met with cases which appeared to bear a very close analogy to puerperal peritonitis, in males labouring under disease in or about the bladder. Some of these were of the class already mentioned, in which the degree of pain is by no means proportioned to the degree and extent of the inflammation.

It by no means unfrequently happens, that the quantity of serous effusion bears a very large proportion to that of the coagulable matter. This form of peritonitis is very apt to assume a chronic state; from which cause, as well as from the imperfectly characterized or ill-observed symptoms of inflammation which attended the attack, it is often very difficult, if not impossible, to distinguish this affection during life, from cases of purely hydropic or atonic effusion. It may, I think, be truly said to constitute the most obstinate and distressing form of ascites. It has, however, been questioned, whether the term 'ascites' ought to be given to these effusions; and in an elaborate Thesis by Dugés, an inquiry is instituted into the possibility and means of distinguishing the two affections, during life. But, after all the pains which the author has bestowed on the subject, it must be confessed that much difficulty at times unavoidably attends the diagnosis. It is difficult, even on inspection after death, to draw, in all cases, the line of demarkation; for, as I have remarked with respect to effusions into the pericardium and the pleura, so also in the peritoneum, the atonic and those of an inflammatory character pass insensibly into each other. The small quantity of tender false membranes which we so frequently meet with when the serous effusion is very

in the form
of serum.

Contraction
accompany-
ing inflam-
mation with
serous effu-
sion.

copious, although they must unquestionably be referred to an inflammatory origin, are, in many cases, to be regarded rather as the result of a secondary action, which the presence of the fluid has excited in the peritoneum, than as indicating that the effusion was originally of an inflammatory nature. In those cases in which the peritoneal effusion is to be attributed to chronic peritonitis, a false membrane, which is often of great tenuity, but closely adherent to the serous membrane, may be detected wholly, or to a considerable extent, investing the surface of the peritoneum. The omentum is contracted, or corrugated and folded up, under the greater curvature of the stomach; and at times reduced to so small a compass, as to be scarcely recognizable. If old adhesions have partially fixed the omentum to some part of the pelvis—which is particularly frequent in females, in whom the adhesion of the omentum to the uterus probably takes place during pregnancy—the omentum, instead of being wholly drawn up under the stomach, is found extended, in the form of a cord, between the stomach and the part of the pelvis to which the adhesion had been formed. Besides the contraction of the omentum, the mesentery is found more or less shortened, by which the intestines are drawn up to the spine; and, if a hernia had existed, it will sometimes be found to have been completely reduced. The intestines are more frequently reduced in length than contracted in their calibre. In extreme cases, they probably lose nearly or quite half their dimensions, and the valvulae conniventes are consequently placed very closely to each other. This contraction of the omentum, mesentery, and intestinal canal, is, I believe, perfectly analogous to the contractions of the chest which I have noticed as occurring after pleurisies; and seems to depend on the contractions which newly-formed parts undergo after they have become organized or permanent, as we see in the large cicatrices of extensive burns. In the instances now before us, the contraction appears to depend in part on the false membrane

covering the peritoneum, and partly on the deposit on the attached surface. It is also evident, that the original structures are themselves reduced by absorption; partly under the influence of the contraction of the adventitious deposit, and partly under the pressure of the fluid effusion. I am not aware that these contractions, resulting from chronic peritonitis, have been either noticed or explained by any author; except that Dr. Baillie has mentioned, that the omentum is occasionally found, in the form of a thick circumscribed mass, lying under the greater curvature of the stomach; and has attributed this state to the extravasation of coagulable lymph into the cellular membrane between the lamellæ of the peritoneum.

As we shall see, in the case which I am about to relate—in which most of the appearances, just described, presented themselves in a remarkable degree—there was obviously no deposit within the omentum. John Holbeach, rather above the middle age, died in Job's Ward, 24.11^{mo} (November) 1825, having long laboured under anasarca, with copious effusion into the peritoneum. The subject was above the middle size, and of unusual weight and corpulence. On the exterior, there were considerable abrasions of the back, with redness and ulceration of the lower extremities. The abdomen was of very large size. An opening being made into it, between four and five gallons of serum were withdrawn, by means of a syringe. The intestines were not observed to be floating in the serum, as is often the case in ascitic subjects: no omentum covered them; and they did not fall into the pelvis. The rectum alone was to be seen in this part of the abdominal cavity. The other intestines were unusually bound down to the spine. With the exception of the transverse colon, there was little difference to be observed between the large and the small intestines; the former being shrunk, and retaining but slight traces of the appendices epiploicæ, while the latter were somewhat distended. They were

Case illustrative of this phenomenon.

both of an unnatural leaden colour, and preserved their cylindrical form as if distended by their contents. The tranverse arch of the colon was of the usual thickness, but short, and drawn up immediately under the liver; by which it was partly concealed. A light-coloured ridge, scarcely so thick as one's little finger, extended along the greater curvature of the stomach, which was very much concealed by the colon and liver. The liver appeared rather shrunk: its surface was botryoidal or reniform; and was of a white colour, as was also the gall-bladder. On removing the viscera from the abdomen, the alimentary canal appeared to be unusually short. The mesentery and mesocolon were extremely short, accounting for the intestines appearing bound down to the spine. An adventitious membrane extended over the whole peritoneum, without forming bridles uniting the intestines, and appeared, at first, like a mere thickening of the serous membrane; but, with a little care, it might satisfactorily be separated from it. It was particularly thick on the liver, giving it its white colour. It was somewhat thinner on the intestines, allowing their dark coats to be seen through it. It was thinnest on the parietes, where its existence could scarcely be shewn. On removing this membrane from the before-mentioned line passing along the stomach and colon, the omentum was discovered within it, folded together, and reduced to a mere rudiment. The mucous membrane of the alimentary canal appeared to have been the subject of much venous congestion; and in the stomach, it was of a darkish grey colour, from deposition of carbonaceous matter. The thickness of the coats of the intestines was principally owing to their being shortened, and to their œdematous state. The surface of the liver seemed to announce the existence of numerous large tubercles imbedded in its structure: such, however, did not prove to be the case. One nearly uniform derangement pervaded the entire substance of the organ. Its cellular tissue had undergone a fibro-cartilaginous degenera-

tion, and, being increased so as to constitute the greater part of the organ, rendered it extremely hard and dense; and compressed the glandular structure, which had become of a pale yellow colour. Notwithstanding this degeneration, bile of a tolerably healthy character was secreted. The spleen, though of a dark colour, retained its structure, with little or no alteration. The kidneys seemed to have a more venous hue than is natural to them, but in other respects might be considered healthy. Nothing particular was remarked in the pancreas. There was a considerable quantity of fluid in the pleuræ, but apparently of no long standing, as the structure of the lungs appeared no where condensed by its pressure: they were rather œdematous, especially the right. The heart might be considered of the natural size, for the age of the patient.

I have inspected and recorded several instances of similar contraction of the omentum and mesentery; and some of the cases are illustrated by Preparations in the Museum.

Before I proceed to speak of the appearances which inflammation produces on the attached surface of the peritoneum, I must say a few words respecting partial inflammations of the polished surface. Like the partial inflammations of this description which occur in the pleura, they appear to be more often the effect of a local than of a general cause; and hence we find, that certain parts of the peritoneal surface are more liable than others to become the seat of these limited inflammations; as, the convex surfaces of the liver and spleen; the right Iliac fossa; and, in females, the broad ligaments and Fallopian tubes, the parts immediately adjoining them, and the space between the uterus and rectum.

The partial inflammation on the convex surface of the liver is, I believe, to be referred to some derangement existing in this organ itself; although it may have been of so slight and transient a nature, as not to have left any traces of its existence in the glandular structure. The jaundice,

Partial inflammation
of perito-
neum.

Broussais
Page 361

Inflamma-
tion of,
1. Hepatic
peritoneum;

*See Broussais
Periton. Splenic
Periton. most
frequent.*

and the fulness and weight of the right hypochondrium, which accompany the attacks in which these inflammations are supposed to exist, appear to me to favour this view of their origin. When inflammation is seated between the convex surface of the liver and diaphragm, adhesions are produced, which generally assume the form of long slender filamentous bridles; in consequence, as it would seem, of the constant motion which takes place between the affected surfaces.

2. Of the
splenic pe-
ritoneum;

The peritoneal inflammations which take place in the neighbourhood of the spleen appear, like those just described, to owe their origin to causes existing in the subjacent organ. It is manifest, however, that both these partial inflammations in the neighbourhood of the spleen, and the derangements of this organ which accompany them, are generally attended neither by well-marked nor serious symptoms: for, although adhesions on the convex surface of the spleen are perhaps only second in frequency to adhesions of the pleura, it is comparatively rare that we hear of patients labouring under splenitis. This fact, I conceive, can only be attributed to the low degree of sensibility, and very feebly-marked sympathies of this organ, whose obscure functions have so long puzzled physiologists. It can scarcely escape observation, that there are numerous individuals, both males and females, but especially the latter, who, without considering themselves sufficiently indisposed to interrupt their ordinary avocations, are very subject to uneasiness, amounting to a pain or stitch in the region of the spleen, or who find it difficult to recline on that side. I suspect that many of these cases are connected, either with old adhesions on the surface of the spleen, or with the inflammatory attacks which have a tendency to give rise to them. The relief afforded by leeches or cupping seems to favour such an idea.

3. Of the
peritoneum
in the Iliac
fossa;

The partial inflammation of the peritoneum, in the Iliac fossa, is sometimes set up by disease in the Appendix

cæci. If this be inconsiderable, it may merely give rise to some very limited partial adhesions: at other times, the Appendix having been perforated by ulceration, occasioned by the lodgement of faecal concretions in its cavity, extravasation takes place, and inflammation of a more severe and serious kind is originated. Even in these cases, nature sometimes succeeds in limiting the inflammation to a part of the right side; but it is at other times diffused over the whole of the abdomen, is accompanied by symptoms of the most serious nature, and quickly proves fatal.

The peritoneal adhesions in the neighbourhood of the appendages of the uterus appear in most cases, like those occurring in the neighbourhood of the spleen, to be not accompanied by any marked or serious symptoms. From the character of the individuals in whom they are most frequently found, it is rendered extremely probable that they are induced by the inordinate exercise of the parts which they implicate. It is obvious, that, in many cases, they must afford an effectual and permanent obstacle to conception. That the effect of partial peritonitis should frequently be met with, in the form of a more or less inorganizable product of inflammation, deep in the cavity between the uterus and the rectum, may be attributed to two or three causes. In the first place, being nearly or quite the lowest part of the abdominal cavity, it receives the product of secretion or inflammation from other parts. Secondly, when this product is so collected, it is liable to become a source of irritation, which not only prevents absorption, but adds to the effusion. The third, and perhaps the most important circumstance is, that inflammation may be communicated to this part from the uterus itself. We know that such communication is by no means unfrequent in the serous membranes. The os and cervix, from their more complicated structure, from their function and greater exposure, are unquestionably the parts of the uterus most liable to become diseased. The movements of

4. Of the
uterine pe-
ritoneum.

*rupture of
coat. Sub: Sour.
July 34. V. 5.*

Causes of
the fre-
quency of
adhesions
about the
uterus.

this part, occasioned by the expulsion of the feces, and even by more inconsiderable but more frequently-repeated causes, must have no little influence in keeping up inflammation, when once induced.

Next to the parts which I have now mentioned, the surface of the small intestines appears to be the most prone to peritoneal inflammation. The mesentery and mesocolon, in these cases, very frequently escape, probably from the same cause as that which protects from pleuritis the interlobular fissures of the lungs.

Parts most
rarely
affected.

The peritoneum lining the parietes, and covering the stomach and the urinary bladder, appear to be the parts of this membrane which most rarely become idiopathically inflamed. The constant variations of distension and contraction, to which they are exposed, probably tend to diminish their sensibility, and confer upon them their comparative immunity from inflammation. From the remark which I have just made, it will be, perhaps, inferred, that I regard the inflammation of the peritoneum covering the stomach, or what is called serous gastritis, as a very rare affection. It is indeed so rare, that I do not wish this important fact to be left to mere inference. I believe serous gastritis to be little more than a mere nosological division, employed by systematic writers and teachers; whilst the disease represented by it scarcely exists, save in theory. The symptoms supposed to characterize this affection may be occasioned by the state of the internal surface; or they may even be produced by that of remote parts, with which the stomach is closely connected by its mysterious sympathies; as in the case of the urgent vomiting, and other symptoms of diseased stomach, which occasionally exist during pregnancy, or in conjunction with uterine disease. The records of inspections in which false membranes, or other products of inflammation, have been found upon the serous surface of the stomach, do not invalidate the assertion which I have made: they may arise from coagulable lymph or puriform matter

Serous
gastritis.

having been conveyed from other parts of the peritoneal surface. The partial inflammation of the peritoneum, affecting the serous surface of the stomach, may however exist, as a secondary affection; and be induced by corrosive poisons taken into the stomach, or by the ulceration of the internal surface, producing or approaching to perforation.

A peculiar result of peritoneal inflammation is sometimes met with in certain parts to which it may be regarded as almost exclusively confined. The appearance consists in a very remarkable semicartilaginous thickening, interrupted by spots, having a circular figure and small size, at which the thickening is either very inconsiderable or wholly wanting: they may be either distinct or confluent. The surface so affected has a worm-eaten or honeycomb appearance. The parts of the abdomen in which this is met with, are, the surfaces of the liver and spleen. I do not remember to have myself inspected, or to have witnessed an inspection of a case in which the production of this appearance was in progress; but, from the strong resemblance which the affected surface bears to a condition of the pleura which I have already mentioned, I am led to believe that the depressions are occasioned by a small collection of inorganizable matter, interfering with the deposition of the more plastic matter on which the surrounding thickening depends.

The scabrous product of inflammation is seldom seen on the surface of the peritoneum with appearances perfectly similar to those which we meet with on the pericardium and pleura; but where the serous effusion has been considerable, with few if any flakes of coagulable lymph, I have seen numerous small elevations, frequently possessing some degree of opacity, and without the regular arrangement which is sometimes met with in the two other serous membranes alluded to. The roughness of the peritoneum, now under consideration, has been frequently met with upon the convex surface of the liver, on the corresponding surface of the diaphragm, and on the anterior parietes. This

Insulated
semicartila-
ginous
thickening
of perito-
neum.

Appearance
of perito-
neum re-
sembling
scabrous
product of
inflamma-
tion.

*See Boursais
V. 2. P. 327*

state of the peritoneum appears to form an approach to the deposition of scrofulous tubercles. Genuine scrofulous tubercles are generally met with beneath the serous membrane; and must be spoken of in conjunction with other derangements in that situation.

Malignant
growths on
free surface
of perito-
neum.

I have seen two instances in which the free surface of the peritoneum appeared to be deranged by malignant disease. One of them occurred in a young man who died of fungoid disease of the kidney. In addition to numerous small malignant tubercles situated in or beneath the peritoneum, the free surface was thickly set with short slender ramifying filaments, slightly enlarged at their free extremities, and bearing a close resemblance to some fungoid growths from the mucous membrane of the urinary bladder. The other case occurred in a female about forty years of age, who died after having presented symptoms of acute peritonitis supervening on abdominal tumors of rapid formation, supposed to be ovarian, and situated in the right Iliac region. On inspection, a fungoid tumor was found affecting the right ovary, or in the folds of the broad ligament on that side. Numerous small fungoid tubercles were very thickly placed on the attached surface of the peritoneum covering the intestines, and elsewhere. The most remarkable appearance, however, was exhibited by the product of inflammation on the free surface: it appeared almost entirely to consist of a feebly concrete substance, in the form of globular masses of a lamellar structure, and exhibiting traces of that arrangement which I shall more fully explain in a future Lecture.

Detached
bodies in
peritoneum.

Perfectly detached concretions of a rounded figure, and of a semicartilaginous, or, in some instances, of a bony character, are occasionally met with in the peritoneal cavity. With respect to their nature and mode of production, I need not repeat what I have already stated on this subject in my general remarks on the serous membranes, and also in my last Lecture. In the peritoneum, I have met with these

concretions in three different situations. I found one, of the size of a marble, between the folds of the greater omentum, which were remarkably free from adhesions: it was therefore evident that there had not been any considerable peritonitis connected with the production of this concretion; but there was one spot, resembling an old cicatrix, which induced me to doubt, whether, in this instance, the concretion might not have been produced by the effusion of a small quantity of blood from an injured spot, rather than of plastic lymph from an inflamed surface. In another instance, two small bodies, in figure and size resembling peas, were found in the pelvis: and I have met with at least three or four instances, in which rounded bodies, of about the size of a marble, and of the character before described, were found imbedded in the convex surface of the liver, between it and the diaphragm: they might have been easily mistaken for a kind of tubercles, had it not been evident, on careful inspection, that they were external to the liver, and only connected with its surface by slight and adventitious adhesions.

Hydropical effusions in the peritoneal cavity are of very frequent occurrence, and may depend on any of the causes which are apt to give rise to these effusions; such as, disease of the heart or lungs, disease of the liver attended with obstruction, and, more especially, that state of the kidneys pointed out by Dr. Bright. Exposure to cold is one of the most common exciting causes; and may bring the disease into existence, independently of any of the other causes to which I have alluded. Although the effusion may have been commenced independently of inflammation, the effused fluid is very likely to set it up, in a chronic form. The contraction of the omentum, appendices epiploicæ, and mesentery, are, perhaps, the most common results of this continued but low degree of inflammation. The quantity of serum which may be effused in cases of ascites is often very considerable. Many gallons have been drawn off by

Ascites.

paracentesis. Portal states, that upwards of six gallons have been drawn off at one operation. Very considerable hydropic effusions into the peritoneum have often been satisfactorily removed by absorption, even when complicated with organic disease of the liver.

Bloody
spots on the
peritoneum.

The peritoneum is sometimes found sprinkled with small bloody spots, in consequence of purpura. I have more than once seen this appearance in conjunction with jaundice. From this cause, blood may be found mixed with the secretion in the peritoneal cavity. Blood is more frequently, as well as more abundantly, found in this cavity, in consequence of violence to the liver or spleen, of wounds of the abdomen, or of the bursting of aneurism. Chyle has been said to have been found in the abdomen. Such an occurrence is just possible, from the rupture of the receptaculum chyli; but it is more probable that some form of non-plastic inflammatory effusion may have been mistaken for chyle. We cannot doubt that a similar mistake has been made in those cases in which milk is reported to have been found in the abdomen. When air is found in the peritoneal cavity, it must, in most cases, be the result of decomposed secretion, or of perforation of the alimentary canal. Whether it ever proceeds from any other cause, is rather doubtful.

Morbid
anatomy of
the attached
surface of
the perito-
neum.

I shall now proceed to speak of the morbid appearances seen on the attached surface of the peritoneum. From the great extent of this surface, but more particularly from the variety of the parts to which it is applied, and the different degrees of intimacy with which it is united to them, it presents, in different parts, a considerable variety in its proneness to disease, as well as in its appearance under morbid action. Dalmas, jun., who has specially treated of the diseases of the sub-serous and sub-mucous cellular membrane, has laid great stress on the degree of laxity and vascularity of this structure; and particularly alludes to that situated beneath the peritoneum. Although I perfectly agree with him, in thinking that the proneness to disease in this struc-

ture bears an intimate relation to its laxity and vascularity, yet I think he has considerably overrated both the degree of exemption which he considers the smooth surface to possess, and the increased liability of the attached surface in those situations in which the laxity is most considerable. For example, he describes it as extremely rare for the mesentery and omentum to produce false membranes, or acquire adhesions on their surface. All their alterations, he says, take place within their substance. These are assertions to which I must offer a modified dissent. I have already remarked, that adhesions between the omentum and the viscera in the pelvis are by no means rare; and I have occasionally seen its posterior surface almost universally attached to the intestines. It is true, that the layers of the mesentery rarely become united; but I have both explained the cause to which this exemption may be attributed, independently of any peculiarity in the attached surface; and have also brought forward examples in which such adhesions had actually taken place. In the pelvis, in which the sub-serous cellular structure is more abundant, lax, and vascular than in the omentum, adhesions and false membranes, on the smooth surface of the membrane, are, in the female especially, particularly frequent.

We find on the attached surface of the peritoneum all those forms of inflammation which are observed on the attached surface of the other serous membranes. The appearance of œdema beneath the peritoneum is probably less often the result of inflammation, than of a more purely hydropic tendency, induced by disease of the lungs, heart, liver, or kidneys. By whatever cause induced, it is necessarily most distinct in those situations in which the cellular tissue is loose and abundant: hence it is often copious about the kidneys and the pancreas, the lobules of which it sometimes separates. It not unfrequently adds a considerable thickness to the parietes of the gall-bladder; and when this is the case, the lymphatics of this viscus are often

œdema of
sub-perito-
neal cellular
tissue.

X

beautifully distinct and turgid. In the intestines, though these are often the subject of œdema, the effusion is generally separated from the serous membrane by the muscular coat; between which and the mucous membrane, its presence often forms a remarkable phænomenon, which will with more propriety be treated of in conjunction with the gastro-intestinal lining. Although the peritoneum appears to be very intimately united to the uterus in its unimpregnated state, yet, even behind this portion of the peritoneum, œdema is sometimes to be met with.

Formation
of vesicles
beneath the
peritoneum.

Circumscribed serous effusions of a remarkable character are not very unfrequently met with about the ovaries, Fallopian tubes, and broad ligaments. On the ovaries, they sometimes assume the form of minute transparent vesicles, evidently situated between the peritoneum and the fibrous coat of the organ. We find them varying in size, from that of a millet-seed to that of a pea or marble. Magendie has mentioned similar vesicles observable on the ovaries of bitches, shortly after impregnation; and hence, though we are scarcely warranted in regarding them as strictly the result of inflammation, it seems probable that they owe their origin to a degree of irritation bordering on this state. Another description of sub-peritoneal vesicles of a more permanent nature, and most probably of congenital formation, is more frequently met with attached near to these organs. They consist of vesicles, generally of about the size of a pea, having firmer and more evidently vascular coats than those which I last described; and attached by slender peduncles, often of one, and sometimes of two inches in length. They are found on the fimbriated extremities of the Fallopian tubes, as well as on the ovaries. We meet with them in young subjects, as well as in those advanced in years; and though abnormal, they can scarcely be regarded as morbid appearances. I enumerate them rather for the sake of hereafter pointing out the distinction which must be drawn between such cysts, and others which at times

affect these organs, than for the sake of their own intrinsic importance.

The circumscribed collections of serum, which are formed between the folds of the broad ligaments, often attain to a much larger size, equalling in volume an egg or an orange; and I think it extremely probable that they may at times acquire a size sufficient to produce large abdominal tumors, and to constitute one of the forms of encysted dropsy which have been erroneously considered as ovarian. When of moderate size, these cysts or collections of serous fluid beneath the peritoneum forming the broad ligaments might easily be mistaken for collections formed within the obstructed Fallopian tube; but, by laying the tube open, or filling it with mercury or some other fluid, its want of connection with the sac containing the fluid may be demonstrated. When the cysts are of such large size as to incur the chance of being mistaken for a disease of the ovary itself, we may sometimes be set right, by discovering this organ with its structure unaltered, or by the solitary character of the cyst, which does not present that remarkable and highly interesting feature of the other and more frequently ovarian form of encysted dropsy—the formation of secondary cysts.

Serous
cysts in
broad liga-
ments.

When, in the place of serum, and as a direct consequence of inflammation, we have the effusion of a less aqueous material, this may either be of the plastic, or of the inorganizable kind. The former is the least frequent, if we except its partial and very limited occurrence beneath those portions of the peritoneum which invest the liver and the spleen, or where tumors are developed beneath the peritoneum; such as, hydatids and extra-uterine fœtuses. I have seen one instance of such deposit, to a considerable extent, in the sub-serous membrane covering the urinary bladder. When at all abundant, it is extremely prone to assume a dense and semicartilaginous structure; and has a considerable tendency to acquire a bony or

Effects of
inflamma-
tion on the
attached
surface.

Plastic effu-
sion.

earthy character, in conformity with the general remarks which I offered in speaking of the morbid changes which take place on the attached surface of the serous membranes. Examples of the appearance which I have been describing, may be found in cartilaginous and bony patches on the spleen; beneath hernial sacs; and more particularly, beneath such portions of peritoneum as may cover any of the forms of tumor of which the abdominal cavity is liable to become the seat. For example, irregular plates of cartilage, or bone, are very apt to be formed in the parietes of those cysts, which envelope either a family of acephalocyst hydatids, or a chronic ovarian tumor, such as those which contain fat, hair, and teeth.

Non-plastic
effusion.

The inorganizable deposits are found either in the form of circumscribed purulent collections which at times occur in conjunction with a plastic effusion, which has produced bridles and membranes on the polished surface; or in the form of a more or less concrete puriform layer without defined limits, and diffused through the sub-serous cellular membrane which it infiltrates. I have found this form both in the mesentery and under the peritoneal coat of the intestines, in cases in which the inflammation appeared to have been occasioned by a local rather than a constitutional cause; and, in conjunction with this, there has been, on the polished surface, an effusion which held a middle character between the plastic and inorganizable form. Whilst I state these as facts which appeared to be worthy of observation, in the cases which have fallen under my notice, I am far from asserting that they are essential concomitants of that particular state of the sub-serous cellular membrane of which I have been speaking.

Lacerability
of the sub-
serous cel-
lular tissue
from sero-
purulent in-
filtration.

There is another state which inflammation produces on the unattached surface of the peritoneum, which is particularly worthy of attention; and is more closely allied to the cases last mentioned, than to those which are accompanied with the plastic or organizable deposit. The attachment of

the peritoneum to the parts over which it is spread, becomes of the weakest possible description, from the soft and lacerable state of the intervening cellular membrane, which we find infiltrated with a thin and dingy sero-purulent fluid. This fluid is, in some situations, more or less tinged with blood.

This state of the peritoneum is found affecting a much larger extent than that which I last considered, but, like it, is restrained by no defined limits. The situation in which it is by far the most frequently met with, is the pelvis; where its production is most probably favoured, not only by the quantity and character of the cellular membrane, but by the position of the parts, and the nature of the viscera, over which this portion of the peritoneum is extended. Such is the facility with which, in this state of the attached surface of the peritoneum, the pelvic viscera may be separated from their serous covering, that the scalpel is scarcely wanted for their removal, and the finger finds almost no resistance in passing through them. In most, if not in all the cases in which I have met with this disorganization, it concurred with a soiled and highly puriform secretion, diffused, in a moderate quantity, over the smooth surface of the peritoneum. In a large majority, it concurred with, and appeared to depend upon, disease of, or injury done to, some of the pelvic viscera, or parts in their immediate neighbourhood. Thus I have met with it in puerperal peritonitis, in the peritonitis which had succeeded to stricture, or disease of the bladder, and in persons who have died after lithotomy, extravasation of urine, or fracture of the pelvis.

The extremely lacerable state of the subserous cellular membrane, facilitating the separation of the parts between which it is interposed, is not only the result of a high degree of acute inflammation, as in the cases which I have been describing, but is also met with in a somewhat different, though no less remarkable form, in conjunction with chronic peritonitis. We find it, both when this form of inflammation

Lacerability of sub-mucous cellular tissue concurrent with that of sub-serous, in some forms of chronic peritonitis.

is accompanied with a very copious serous effusion, and also when there is little or no fluid in the abdomen, and the intestines are inextricably matted together by universal adhesions. In these cases, the lacerability of the cellular structure is not confined to that which unites the peritoneal to the muscular coat of the intestines, but extends to that which is situated between the muscular and the mucous. Indeed, it is, in general, much more strikingly evident here than in the more immediately sub-serous cellular membrane; a circumstance, which, though in part ascribable to the greater abundance of the sub-mucous tissue, is probably in a greater measure owing to the superior firmness of the mucous coat, which renders its separation at once more easy and more conspicuous. When this state exists in a very marked degree, several feet of mucous membrane may be drawn out, almost without any effort. This remarkable phenomenon, though noticed by one or more of the older morbid anatomists, has been, very generally, either overlooked or neglected. I am not aware that even Dr. Baillie has made any allusion to it; and it was not until I had myself collected several examples, that I learned that Dr. Barron had noticed the ready separation of the coats of the intestines in that form of disease, which, notwithstanding the Doctor's opinion, I cannot help regarding as a chronic inflammation of the peritoneum. He has both described this ready separation, as seen in one case by himself; and has quoted an example from the writings of De Haen. Both of these authors describe the separation as principally, if not solely, taking place between the serous and the other coats. The cases which I have myself seen, left no room to doubt the more ready separation of the *mucous* membrane. In all these cases, there was a paleness and want of cohesion in the muscular coat, the fibres of which were very distinct. The following remarkable case, in which I first noticed this phenomenon, will tend to explain it more clearly.

Case.

Elizabeth Sayce, aged 20, was a patient of Dr. Bright, in

Charity Ward. She had laboured under protracted symptoms of fever, with frequent vomiting, and obstinate constipation. The inspection was made on the 8th of 6th month (June) 1826. The head was not opened. The pleuræ were nearly if not quite free from adhesions; but there were some traces of inflammation on the right side, where there was an evident deposit of coagulable matter. There was no notable quantity of fluid on either side. The lungs readily collapsed on the opening of the chest. They were of a light colour, free from black pulmonary matter, and, with the exception of a little cadaveric infiltration posteriorly, they were generally of a pale red colour. There were a few small defined tubercles, varying in size from that of a millet-seed to that of a small pea, quite in an incipient state, firm and crude. The texture of the lung in their immediate vicinity was light and crepitant, and appeared to have undergone no change.

The heart was of moderate size, and healthy.

The parietes of the abdomen were generally and firmly connected to the viscera, by a thick, but rather soft adventitious membrane, loaded with minute cheesy scrofulous tubercles of a light yellow colour; whilst the small intervening spaces were, for the most part, of a dark venous hue, but, in some spots, of a brighter colour. This was particularly the case about the hypogastric region, where the adventitious membrane formed two distinct layers; the one lining the parietes, the other covering and connecting the intestines. They had smooth and apparently secreting surfaces, by which they were applied to each other; and which, in addition to the bright red tinge before mentioned, presented additional traces of recent inflammation in some soft coagulable matter, forming tender fibrinous adhesions. There was no trace of omentum distinguishable from the before-mentioned adventitious matter; which dipped in between the convolutions of the intestines and the different viscera, uniting them inextricably together. The tubercles

were not nearly so numerous in that part of the adventitious membrane which dipped in between the viscera, as in those portions which were stretched over them, and lined the parietes. Extensive and intricate adhesions rendered it impossible to distinguish the mesentery. The glands did not appear to be remarkably large, or to be loaded with tuberculous matter, from which the posterior part of the abdomen was nearly exempt.

The stomach was small. Its lining membrane was of a deep red towards its cardiac extremity; but the middle, and the pyloric extremity, were of a pale dusky hue. In attempting to separate the convolutions of the intestines, the adventitious matter which united them, and also the muscular and peritoneal coats, gave way, and were torn through; leaving entire the mucous coat, which adhered so slightly to the muscular, that several feet of it could be withdrawn without the slightest difficulty. This was the case in the large, as well as in the small intestines. The muscular coat was thin and pale; and, though tender and lacerable, its fibres were distinctly visible. The mucous coat was of a pale leaden hue; but little thickened, and in general pretty firm; though some parts were easily lacerated. The intestines, but more particularly the large, contained somewhat hardened fæculent matter, of a pretty uniform turmeric yellow colour. The liver was remarkably pale, and the gall-bladder nearly empty. The structure of the spleen was quite healthy; but it was readily torn away from its proper tunic, which was held by adhesions contracted with the surrounding parts. The pancreas and kidneys were healthy. The uterus and its appendages were covered by adventitious membrane, thickened by tuberculous matter. The right ovary was enlarged by a deposition of the same substance.

Matting
together of
intestines
concomitant
with this la-
cerability.

The remarkable degree of lacerability of the sub-serous and sub-mucous cellular structure of the intestines, in the case which I have just detailed, was concurrent with an equally remarkable adhesion between the convolutions of

the intestines. A similar, but somewhat less considerable adhesion between the intestines, occurred not only in most of the cases which I have since seen, but also in that which Dr. Barron has quoted from De Haen. The coincidence, however, is not universal; and, as I have already said, the state of the sub-serous cellular membrane which I have been describing accompanies some cases of ascites from chronic peritonitis. In a case of this kind, I have found it in conjunction with a considerable degree of shortening of the mesentery. A very similar case occurred, not long since, to my friend Dr. Stroud. The separation of the mucous coat was, in this instance, most remarkable in the appendix cæci; and very completely exposed the muscular fibres of this part.

We may now proceed to the consideration of the heterologue deposits which are met with on the attached surface of the peritoneum. Of these, scrofulous tubercles and tumors are not only the most frequent, but are also the most nearly related to some of the affections of which we have already spoken. They appear, indeed, to consist of the inorganizable matter of inflammation, although no symptoms of irritation or inflammation had been at all perceptible during their formation. When well defined, they are seen involved in a sort of tunic, or cyst, which appears to have been formed from the surrounding cellular structure, somewhat condensed; and is of a character totally distinct from that of the cysts which I shall hereafter describe to you as forming the basis of many tumors of a supposed malignant character. Sub-peritoneal scrofulous tumors are of the largest size, and most frequent occurrence, between the folds of the mesentery; but these, in most instances, belong rather to the derangements of the lymphatic glands, than to those of the sub-serous tissue. Scrofulous tumors are sometimes found in the omentum; and in this situation they are said to attain to a considerable size. When they occur beneath the peritoneal coat of the intestines, which is by no

Sub-peritoneal heterologue deposits.—Scrofulous tubercles.

means unfrequently the case, they are generally of small size, but very numerous; and, at times, give to the intestines the appearance of being sprinkled with particles of boiled rice. These little tubercles are often surrounded by a vascular areola, which sometimes acquires a dark colour, from a change of the blood within the vessels. When very minute, and meriting the appellation of miliary, they appear to be situated between the layers, into which the serous membrane itself, notwithstanding its tenuity, may sometimes be split. I have seen this fact clearly demonstrated by my friend Dr. Hughes.

Malignant
growths.

The next form of deposit of which I shall speak, comprises those of a cancerous or malignant nature; which, like tumors of the same description in other situations, are known by the names of scirrhus, fungoid, melanoid, &c. In some cases, they appear to have originally and primarily invaded the attached surface of the peritoneum; whilst in others, the disease, having attacked a different tissue, is at length propagated to this. In the former case, the tumors are often remarkable for their size, number, and diffusion. Yet, even in these cases, some portions of the peritoneum more frequently escape than others. Thus, the morbid growths are not so often met with on the parietes, as in the omentum, or in the intestines; and when found in the parietes, they are generally of smaller size. Neither the mesenteric glands, nor the other organs invested by the peritoneum, are apt to become affected by the extension of the disease; but its relation to the serous membrane is occasionally evinced by its appearance in the pleura. They are sometimes, although not necessarily, accompanied by an effusion into the peritoneal cavity; and the ascitic distension, to which they thus give rise, is, now and then, very considerable. When the disease is propagated from another organ already affected, it is generally, but not invariably, limited to the neighbourhood of the part from which it is derived: thus, in a case of scirrhus of the pylorus, we may

find a sprinkling of minute scirrhous tubercles under the peritoneum, in the neighbourhood. A similar remark will apply to cases of malignant tubercles in the liver: and in malignant disease of the uterus, the convolutions of intestine, which happen to come in contact with it, will exhibit growths of a corresponding character beneath their peritoneal coat.

I shall not anticipate the remarks which I hereafter shall have to offer respecting the formation and structure of these heterologue formations; but before I leave this subject, I will detail a case in which I have met with the affections now under consideration in a very characteristic form.

Martha Doherty, a patient of Dr. Bright, aged 40, died in Charity Ward after the fourth repetition of paracentesis. The body was inspected on the 3d of 2d month (February), 1826.

Case of
malignant
disease of
peritoneum.

Head not examined.

Thorax.—The pleura was free from adhesion, and everywhere healthy; except that several small, rounded, fungoid bodies, of a bright-red colour, and scarcely so large as wild cherries, grew from it, on the left side; forming two rows of four or five inches in length, immediately subjacent to the under edges of two contiguous ribs. The lungs were crepitant, and perfectly healthy; except that near the edge of one of the lobes were a few rounded, shot-like bodies, of a black colour throughout. There was no morbid appearance in the heart.

Abdomen.—Notwithstanding the recent operation of paracentesis, this cavity contained several quarts of fluid. The peritoneum investing the parietes was much thickened, of an uneven surface, and offered a few small fungoid granulations. The viscera were almost entirely concealed under the load of fungoid or encephaloid tumors, growing from their thickened and disorganized peritoneal coat. These tumors were of a rounded figure, varying in size from that of a pea to that of an egg. Some were adherent by merely a

slender peduncle. Many were contiguous, running into each other. The omentum was converted into a mass of this kind, and retained no trace of its original structure. For the most part, these tumors were of a white colour, mottled with spots of a venous hue; but the smaller ones had a bright-red, highly vascular, and tender, membranous covering. When cut into, they exhibited considerable variety, both as to colour and consistence. They chiefly contained a substance of a pearly-white colour, soft in all, but in some quite grumous. In the smaller tumors this matter was penetrated by minute florid vessels. In the larger it was more unmixed; though some of these contained cysts filled with a dark bloody or chocolate-coloured fluid, and a few a small quantity of pale transparent fluid. Over the liver and spleen, the accidental tissue was of a firmer structure, of a more dead white, and deposited in the form of a layer of some thickness. The structure of both these organs was unaltered, except that the liver was too soft. The bile appeared to be natural. The pancreas was healthy.

The mucous membrane of the stomach, near to the cardiac extremity, exhibited a considerable extent of darkish ecchymosis. No disease was discoverable at the pylorus, or any other part of the stomach; though this organ may be regarded as favourable to the growth of encephaloid matter. The mucous membrane of the rest of the canal inclined to a leaden hue, without any other morbid appearance. The mesentery was thickened, but nearly or quite free from the cerebriform matter. Its layers were readily separated; and the absorbent glands were very little, if at all altered in size or structure.

The whole urinary apparatus, kidneys, ureters, and bladder, were exempt from disease; yet it is difficult to conceive that the numerous tumors in the immediate vicinity of the bladder could have permitted the retention of more than a small quantity of urine.

The uterus, with its appendages, was completely im-

bedded in the adventitious growth. It was small, and its cavity healthy. The Fallopian tubes, though not recognizable externally, were still pervious; but no trace of the fimbriated extremity could be made out. One of the ovaria was found completely imbedded in the diseased growth: it was small: a part of the organ, which appeared to have been the seat of a corpus luteum, was soft, and readily broken down; and a small cyst, containing dark grumous matter, appeared to be connected with it. The rest of the ovary retained its natural structure. The other ovary was so far implicated in the disease as to escape detection. The adventitious structure in the neighbourhood of both ovaries had a more dense and cartilaginous structure than elsewhere; and contained several cysts, filled with a dark thick fluid.

True hydatids, and those more especially of the species *Acephalocystis*, are occasionally developed beneath the peritoneum in different parts of the abdomen, and sometimes give rise to tumors of enormous size. Their most frequent seat appears to be beneath the peritoneal covering of the liver; but they are at times met with in other parts, more especially under the peritoneal covering of the spleen, in the mesentery, and between the folds of the broad ligaments. In this latter situation, they constitute a form of encysted dropsy, which it is nearly or quite impossible to distinguish, during life, from genuine ovarian dropsy. The appearances discoverable after death have likewise been confounded, although the characters of the two affections are essentially distinct.

Hydatid
growths
beneath the
peritoneum.

TUNICA VAGINALIS.

We shall now quit the peritoneum, and say a few words respecting its offset, the tunica vaginalis testis. Like the pericardium, the tunica vaginalis presents one of the simplest specimens of a serous or reflected membrane. Naturally absent during the greater portion of the fœtal life, its deficiency sometimes continues nearly to the time of puberty,

Tunica
vaginalis.

or even beyond that period. It more frequently happens, that though the testis has descended into the scrotum, its serous covering continues to form a process of peritoneum, instead of acquiring a distinct existence.

Distension
of tunica
vaginalis.

The tunica vaginalis is susceptible of very great distension, both from those diseases which augment the volume of the testicle, and from those causes which distend the cavity of the membrane itself; such as, hydrocele, hæmatocele, and congenital hernia.

Results of
inflammation.

The polished surface of the tunica vaginalis sometimes becomes the seat of inflammation; and the membranous bands and bridles which are found uniting its opposed surfaces evince that this effusion has been of the plastic kind. The fact, however, is rendered most completely evident in those cases in which the inflammation of the tunica vaginalis has been purposely excited by art, for the radical cure of hydrocele. I have seen an opaque layer of tender recent false membrane, in which there was an evident admixture of inorganizable matter formed in the tunica vaginalis, which had been punctured in a case of diseased testicle. The tunica vaginalis is sometimes prodigiously thickened by semicartilaginous layers, the result of chronic inflammation in cases of long-standing hydrocele. Loose concretions, of a spherical figure and of about the size of a pea, similar to those which I have described as being met with in the cavities of the pleura and peritoneum, are also found within the serous covering of the testis.

Hydrocele.

Hydrocele, or an accumulation of serous effusion in its cavity, is the most frequent morbid affection to which this membrane is liable. It is probably sometimes of a tonic, and at others of an atonic character; yet, even when belonging to the former class, it appears to depend on an irritation of so slight a nature, as scarcely to merit the name of inflammation. The fluid, though charged with albumen, is rarely mixed with flakes of coagula, but, at times, deposits a very minute quantity of opaque ochry substance.

I have found the free surface of the tunica vaginalis

roughened by minute elevations, as if from a sprinkling of fine sand. This state may be regarded as an instance of that form of inflammation of a serous membrane in which the product is scabrous.

Sanguinolent and sanguineous effusions are met with in the tunica vaginalis, and constitute the disease called Hæmatocele. Sometimes they proceed from the manifest rupture of vessels; and at others, appear to be the result of transudation.

Hæmatocele.

On the attached surface of the tunica vaginalis we find a good specimen of the inflammatory œdematous effusion. We see it in hernia humoralis, and in the radical cure of hydrocele. The close portion of the tunica vaginalis, or a false membrane formed upon it, may sometimes be raised by partial collections of serum in the form of vesicles or blebs. The tunica vaginalis also affords examples of small vascular cysts, attached by long and slender peduncles, bearing the closest resemblance to those which we have described, formed by the peritoneum in the neighbourhood of the ovaries. A body of this kind has, I believe, been mistaken for a third testicle. These cysts are not to be regarded as morbid; but it is proper to bear them in recollection, since it may enable us to satisfy a patient's mind respecting them. The inflammatory deposits on the attached surface of the tunica vaginalis, like those beneath the other serous membranes, are liable to conversion into bone.

Attached surface of the tunica vaginalis.

The heterologue deposits which are formed beneath the tunica vaginalis, whether scrofulous or malignant, generally, if not invariably, belong rather to the testicle, than to its serous membrane. Hydatids have been said to affect the tunica vaginalis. In the only instance in which I have seen true hydatids within the scrotum, I was not able to say whether they belonged to the testicle itself, or to the tunica vaginalis.

Heterologue deposits beneath the tunica vaginalis.

SYNOVIAL MEMBRANES.

Synovial
capsules.

Bursæ
mucosæ,
and sheaths
of tendons.

Loose bo-
dies within
the cap-
sules.

Before I quit the serous membranes, I must say a few words respecting the synovial capsules. The most important of these are met with in the joints, where they are so intimately connected with other tissues, as the fibrous, the fibro-cartilaginous, and the bony, that the consideration of their derangements cannot, with propriety, be taken up at present. They exist more simply in the bursæ mucosæ, and in the sheaths of tendons. Their deviations from the normal state, dependent on deficiency or excess, are of no great interest. The bursæ admit of considerable variety; and may be produced accidentally, in some parts, by pressure and friction. Their secretion, the synovia, which exhibits the transition from serum to mucus, appears to be designed by nature to afford an obstacle to the production of adhesions, as well as to facilitate motion. Adhesions, however, may occasionally be met with.

These membranes are more liable than the more perfect serous membranes to the production of loose bodies which may assume the form of cartilage. The detached state of these bodies may, I conceive, in part be attributed to the obstacles which even the plastic form of inflammation must find to the formation of adhesions. Great numbers of these loose bodies are occasionally found in the synovial sheath of the tendons of the wrist. I have seen them of the form and size of melon-seeds; and, in this case, they readily changed their position on pressure, passing freely from the wrist to the palm, and back again, beneath the ligamentum carpi annulare. The most violent constitutional irritation followed a puncture for their removal. Dupuytren has advanced the idea of their being hydatid formations; but I think them more satisfactorily accounted for, by the analogy which I have pointed out. Arthropuosis is an instance of the non-plastic product of inflammation of a synovial membrane; and the thickening about the bursæ and the sheaths of tendons, of the effect of inflammation on the attached

surface. The product may be bony; as is sometimes seen in the horse.

The most frequent morbid change to which these cavities are liable, is the accumulation of their secretion. This is occasionally a solitary and chronic affection, constituting ganglion; but it is much more frequently acute, more or less general, and dependent on a constitutional state, which may be called the rheumatic diathesis. When this exists, it sometimes brings into view the sympathetic relation which subsists between these membranes and the more perfectly serous: thus, we find pericarditis, pleuritis, peritonitis, and hydrocele, conjoined to, or alternating with, the rheumatic inflammation of the joints, thecæ, and bursæ.

In the chronic affection of the bursæ, constituting ganglion, we sometimes find granular elevations, and filamentous projections from their internal surface; and I have seen similar productions on the internal surface of an adventitious synovial capsule about the extremities of a broken bone, in a case of un-united fracture of the arm.

LECTURE VII.

ON PARASITIC ANIMALS.

REASONS FOR THE PRESENT DIGRESSION.—COMMON ERROR OF CONFOUNDING HYDATIDS WITH ADVENTITIOUS SEROUS CYSTS.—ORDERS OF PARASITIC ANIMALS—THE ENTOZOA—DIVISION OF ENTOZOA INTO THREE CLASSES: 1. THE VESICULAR WORMS OR HYDATIDS—VITALITY OF HYDATIDS—CLASSIFICATION OF HYDATIDS—CYSTICERCUS IN MAN AND THE LOWER ANIMALS—THE POLY-CEPHALUS, DICERAS, AND ECHINOCOCCUS—THE ACEPHALOCYSTIS—STRUCTURE OF THE ACEPHALOCYSTS—GENERATION OF THE ACEPHALOCYST—VARIATIONS FROM ORDINARY STRUCTURE—DEATH OF ACEPHALOCYSTS—CASE ILLUSTRATIVE OF THE ACCOUNT GIVEN OF THIS ANIMAL—SPONTANEOUS CURE OF HYDATIDS—THERAPEUTIC INDICATIONS.—2. THE FLAT WORMS—DESCRIPTION OF DIFFERENT CLASSES OF FLAT WORMS, THE BOTHRIOCEPHALUS LATUS, TÆNIA SOLIUM, FASCIOLA OR DISTOMA, &c.—3. THE CYLINDRICAL WORMS, OR ENTOZOA NEMATOIDEA—THE GENERAL CHARACTERS OF THESE WORMS—REMARKS ON THE ASCARIDES LUMBRICOIDES—SYMPTOMS OF THE PRESENCE OF THESE WORMS—STATE OF THE INTESTINE IN WHICH THEY OCCUR—THE OXYURIS VERMICULARIS, ITS CHARACTERS, SEAT, AND PROPAGATION—THE TRICHOCEPHALUS—FILARIÆ—STRONGYLUS GIGAS—TRICHINA SPIRALIS, &c.—BRIEF COMMENTS ON PARASITIC INSECTS—THE PEDICULUS—THE PULEX—THE ACARUS—THE CESTRI—THE CUTEREBRA—DISCUSSION OF THE QUESTION, HOW DO PARASITIC ANIMALS ENTER THE SYSTEM?—CONNECTING LINK FORMED BY THIS SUBJECT BETWEEN PATHOLOGY AND NATURAL HISTORY.

GENTLEMEN,

IN my last Lecture, I terminated my observations on the Morbid Anatomy of the normal Serous Membranes. The natural order of procedure would be, to advance next to the consideration of those serous membranes which are the result of accidental production, and are occasionally found in different parts of the body, but most frequently in the neighbourhood of the ovaries and uterus. They consist of what are termed serous cysts; and are not only interesting in themselves, but worthy of very careful attention, as elucidating the transition from the serous to the mucous membranes, and as affording a key to the formation and

Adventitious serous cysts.

developement of several of the heterologue structures which constitute some of the most fatal and intractable affections to which the human frame is liable. Prior, however, to a description of the phænomena presented by these adventitious formations, a digression of some length will be necessary, in order to remove a common error in pathology. These cysts are frequently confounded with one of the species of true hydatid, the *acephalocystis*; which, from its total want of continuity with the organ in which it is developed, and from its mode of propagation, is reasonably regarded as a parasitical animal. The description of the various appearances presented by hydatids, and of the morbid changes which they induce in the parts in which they exist, may therefore be regarded as an almost necessary prelude to the consideration of those adventitious cysts to which I have alluded; and the connection between hydatids and other parasitical animals may, I think, afford a sufficient plea for the digression which I shall make, in introducing to your notice some other members of this class.

Reasons for the prior consideration of hydatids and other parasitic animals.

It is not my purpose to trouble you with a zoological synopsis and description of all parasitical animals. When it is recollected, that the mammalia, birds, fishes, reptiles, and even the mollusca, are preyed upon by other animals, which, consequently, must be classed with those now under consideration, it is obvious that they might be made the subject of several distinct Lectures; but this would be foreign to the subject of morbid anatomy, and would be admissible only in a zoological course. I shall present you, briefly, with such a classification as will facilitate the description of the parasitical animals which infest man: and if I incidentally notice a few which are found in other animals, it will be either for the sake of illustrating the subject, or because of some particular interest they may possess.

Of parasitical animals, some classes are found imbedded in the substance of, or lodged in, internal cavities; and are never, or, at most, but rarely and accidentally, met with out of

Orders of parasitic animals.

the body. They constitute the intestinal animals of Cuvier, and the entozoa of Rudolphi. Other parasitical animals support a more distinct life, and have recourse to the animal which they infest only for their supply of food, and for the deposition of their eggs or larvæ. It is for a part only of their lives that they are imbedded in, or attached to, the animal, at whose expense they subsist. The greater number of these belong to the active class of insects; but a few, as, for example, the leech, are found amongst the annelides mollusca.

Entozoa—
where
found.

The entozoa first claim our attention. These, as I have already remarked, can live, and propagate their species, only in the interior of other animals. They are found, not only in the alimentary canal, and in the passages which open into it, but also in the cellular tissue, in the muscles, and in the substance of organs the most inaccessible from the surface of the body; as, for example, in the brain. There is scarcely any animal which is not infested by several species of the entozoa; and it is rare for the same species to be found in more than one, or, at most, in more than a very few species of other animals. The difficulty of explaining in what manner they enter the system, added to the observation that they are not met with out of the body, has induced some naturalists to conclude that they are spontaneously produced. It is certain, however, not only that the greater number bring forth either visible eggs, or living young ones, but that many of them present the sexes distinct, and copulate like other animals. Hence, it is more generally believed that they are propagated by germs sufficiently minute to be conveyed through the smallest passages, or that these germs may be introduced into young animals before birth.

How are
entozoa
produced?

Organiza-
tion of
entozoa.

The entozoa, or intestinal animals, are not possessed of any distinct and visible organ of respiration: they must therefore receive the influence of oxygen through the medium of the animals which they inhabit. No trace of a circula-

tung system has been discovered in them; and the indications of nerves are, even in the most perfect of them, so obscure, that their existence has been doubted. In other respects, they present great varieties in their organization.

The entozoa found in man have been arranged under three heads: 1. The vesicular worms. 2. Flat worms. 3. Cylindrical worms. The two first, or the vesicular, and the flat, belong to Cuvier's order of parenchymatous intestinal animals, or those whose imperfect viscera penetrate and ramify through their substance, and those in which not even a trace of alimentary canal can be perceived. The cylindrical worms, on the other hand, are included in Cuvier's order of cavitaires; or those which have an intestinal canal, furnished with a mouth and anus, and floating in a distinct abdominal cavity.

Classifica-
tion of
entozoa.

1. OF VESICULAR WORMS OR HYDATIDS.

The vesicular worms are possessed of a caudal bladder or vesicle, which constitutes the greater part of the animal, and on which the name of the order depends. It is of a greater or smaller size; and is either proper to one individual, or common to several. In one genus, the *acephalocystis*, the animal consists of nothing but this bladder. Others possess a body, which is always very small in proportion to the animal, and a head bearing some resemblance to that of the *tænia*, and variously armed with tentacula and sucking orifices.

Though vesicular worms, or hydatids, as they are more commonly called in this country, are not of very frequent occurrence in man, yet they are by no means rare. The cases on record shew, that there is no texture or organ of the body in which they have not been found. By their developement in the heart, the lungs, the brain, or spinal marrow, they have immediately interfered with the most essential functions of life. When taking their origin in less-important organs, their progressive growth, and prodigious

Presence of
hydatids in
man, and
their effects.

power of multiplication, may occasion the formation of tumors of the largest size; which, by displacing or causing the absorption of the neighbouring parts, destroy life with almost equal certainty, though more indirectly. No period of life is exempt from them. Portal mentions an instance of their having been found in the fœtus. They are met with in a great many of the mammalia; and it would appear that the cold-blooded animals are not free from them. There is no little confusion in the descriptions which authors have given of them, in consequence of a sufficiently careful distinction not having been made between true hydatids and other cysts, which, though they bear considerable resemblance to them, are, essentially, very different. Respecting the nature of these cysts there is a great difference of opinion. Some naturalists regard them all as possessing a distinct vitality, although of the very lowest order; whilst others, supported by no less authority than that of Cuvier and Rudolphi, are willing to admit as animalcules only some of the more obviously organized vesicular worms. I confess that I am rather inclined to attach myself to the former opinion, and to follow the classification adopted by Cloquet, Portal, and Beclard. It is merely a modification of that of Rudolphi, and divides the *Entozoa Cystica*, or vesicular worms, into five genera: 1. the *Cysticercus*; 2. the *Polycephalus*; 3. the *Diceras*; 4. the *Echinococcus*; and 5. the *Acephalocystis*. Some of these genera are either of rare occurrence, or are almost exclusively met with in the inferior animals; and, as I have not had the opportunity of carefully examining them for myself, I shall pass them over with very slight notice.

Distinct vitality of hydatids.

Classification of hydatids.

Cysticercus.

The *cysticercus* has a head somewhat resembling that of the tænia; and a nearly cylindrical body, terminated by a caudal vesicle. It generally exists singly in the cyst which contains it. It is more frequently met with in the inferior animals, than in man; and is by no means rare in the livers of sheep. In a specimen of human lungs with numerous

hydatids imbedded in them, which I believe was taken from a subject some years since by Dr. Cholmeley, the hydatids appear to be of this genus. The largest of the cysticeri, in this case, might have its caudal vesicle rather more than one inch in diameter, with the neck nearly of the same length. I have seen a cysticercus taken from the pia mater; but, in this instance, the caudal vesicle was scarcely larger than a full-sized white currant. I have also found a cysticercus about the same size in the cellular membrane, external to the fascia, at the upper part of the thigh of a female rather advanced in years. My friend Dr. Sharpey has informed me, that cysticeri are not very uncommon in some parts of Germany; or, at least, that he met with them repeatedly whilst dissecting in Berlin.

The cysticeri of different animals differ considerably in their form and proportion: those in man have, generally, the neck about equal to the diameter of the vesicle, from which it proceeds with a gradual diminution in size. Some cysticeri which I took from the abdomen of a small foreign species of deer had about the same form and proportions as those of man; and the size was about the same. Cysticeri are not uncommon, and attain a large size, in sheep: they are frequently found in the liver, and under the peritoneum forming the mesentery, in these animals. A very fatal and remarkable vertiginous affection, to which sheep are liable, is found to depend on a species of cysticercus in the brain. This malady may be effectually relieved by the use of the trephine. H. Smith of Southam, the philanthropic advocate of self-supporting dispensaries, and other means for benefitting the poor, has informed me, that he has often performed this operation on the heads of sheep with great success; and he recommends it to the attention of young surgeons in the country, not merely as an interesting subject, but as a means of acquiring dexterity in the use of the instrument. The large size of the cysticeri in the abdomen of sheep affords a good opportunity of examining their

Cysticeri
in the lower
animals.

structure. The caudal vesicle does not appear to consist of a perfectly smooth membrane, but presents an infinite number of minute, closely-placed striæ, which appear to be slightly elevated, and to have a direction nearly at right angles to the axis of the animal. We also occasionally find opaque white elevations upon some part of the caudal vesicle. I suspect that they are a morbid appearance in the animal. Cysticerci are said to be common in the pig; but I do not remember that I have ever seen even a specimen of them, and therefore I have nothing to observe respecting them. I have seen small hydatids, which appeared to be of this genus, in the muscular substance of the heart of the bear. The *cysticercus fasciolaris*, which is found about the livers of rats and mice, has a slender neck or body, at times some inches in length. It is transversely striated, and the caudal vesicle is extremely small: it might therefore be mistaken for a *tænia*.

Envelope of
the cysti-
cerci.

The enclosing cyst in which the cysticerci are lodged, whether derived from cellular membrane alone or from a serous membrane in conjunction with the cellular, is generally thin; but when, in consequence of the death and contraction of the cysticercus, the enclosing cyst is allowed also to contract, it may acquire considerable thickness, and a dense structure. This is very conspicuous in the livers of sheep, in which the whole sac sometimes acquires a bony character. The death and contraction of the cysticercus constitute the process by which a natural cure is effected.

Brief notice
of the poly-
cephalus,
dicercas, and
echinococ-
cus.

The tame rabbit is at times infested with hydatids, occupying the cellular membrane between the muscles. I believe these hydatids to be of the genus *polycephalus*. The semi-transparent cyst which forms the principal part of the hydatid presents, at several parts, opaque whitish spots of a somewhat oval figure: they appear to project slightly on the internal surface. Besides these bodies, there are some minute transparent cysts of an irregular figure, having a small attachment to the exterior of the principal sac. Of

the diceras and echinococcus I can say nothing, except that I suspect that some individuals of the genus acephalocystis, presenting numerous white opaque elevations on their surface, have been mistaken for the echinococcus.

The acephalocystis, a genus first established by Laennec, is that which is by far the most frequently found in man. Hydatids of this kind are enclosed in a cyst which is apparently derived from the cellular tissue of the surrounding parts; but acquires a dense and almost semicartilaginous structure, in which bony matter is sometimes deposited. This cyst, in some very rare cases, is said to have been absent. I have never seen an instance of the kind, and the assertion appears doubtful.

Genus acephalocystis.

In a case in which a collection of large acephalocysts had formed under the peritoneal coat of the liver, I found the superficial absorbents greatly enlarged. Many were truncated laterally, and presented two openings into the sac. They were filled with a discoloured turbid fluid. The veins of the liver have been found laterally truncated, in the same manner, at the circumference of the enclosing cyst of an hydatid tumor.

The proper hydatid cysts, which have a lamellar structure, and in consistence bear a great resemblance to coagulated white of egg, have not the slightest connection with the enclosing cyst; and between them, there is generally a thin and unequal layer of a dirty, yellow, semiconcrete substance, which may possibly be an excrementitious secretion from the hydatid itself. The proper cyst is filled with a fluid; which, though generally clear and limpid, is sometimes turbid and discoloured. It is stated, by Dr. Baillie, to be coagulable by heat. Dr. Marcet says, that a very slight turbidity is produced; and that the fluid bears considerable resemblance to that of hydrocephalus, in the small quantity of animal matter which it contains. In an experiment which I made on the fluid of a very large hydatid found in the liver of a child seven years of age,

Structure of the true hydatid cysts.

Character of the contained fluid.

heat produced no change; and the result accords with the experience of Cruveilhier.

It occasionally happens, that a solitary acephalocyst grows to a large size, and contains only the fluid just described: but more frequently we find, besides this fluid, smaller cysts of a similar character; and these again may contain an inferior order. The young hydatids appear to be produced from different parts of the parent cyst; to which they are described, by authors, as being found attached, sometimes on the inside, and sometimes on the outside. For my own part, I have never known an acephalocyst to produce smaller ones, except from its internal surface; and to this I have not seen them attached, except when of almost microscopic size. Whilst scarcely a few hundredths of an inch in diameter, they may be seen in great numbers, perfectly detached, in the fluid of the parent; and neither then, nor when of larger size, have I been able to discover the least trace of neck, or other attachment, to the superior cyst.

On the inner surface of the latter there are frequently seen numerous elevations, variously disposed, and differing both in form and magnitude, but generally minute. The opaque white spots affecting the hydatid membrane are not confined to the internal surface: they are occasionally found upon the external surface. I have seen them half or two-thirds of an inch in diameter, of a circular figure, with an irregular surface, something like that of a cauliflower. It is well to be acquainted with the appearance of these spots; since it may happen that an hydatid tumor may be spontaneously evacuated by a communication with some part of the alimentary canal, and the dead membranes may become so much altered as to be scarcely recognizable whilst coming away in fragments. Yet should one of these fragments possess one or more of these elevations, it is so characteristic, as to remove all doubt respecting the nature of the case. These inequalities have been supposed to depend on nascent hydatids; and the differences

New hydatids generated by the old.

Elevations on the internal surface of acephalocysts.

which they present have been assumed to be the characteristics of three species of acephalocystis. I am satisfied that many of these elevations are morbid growths from the parent cyst; and others of them possibly point out the spots whence the young have already been detached. I am not however prepared to affirm that none of these elevations are attributable to nascent hydatids. In a case examined by Francis Sibson, jun. and myself, numerous transparent spherical granules were seen in the parietes of a parent hydatid acephalocyst: they were, in all probability, nascent young ones, and appeared to throw some light on the mode of production. They were situated much nearer to the internal than the external surface; and, although a few of them were of a larger size than some of the small, perfectly-formed, detached hydatids which in other cases I have seen within the interior of the parent, in this instance there were none which had become detached. I imagine that the separation or retention of these little bodies may in some degree depend upon the nature of the internal surface of the parent. If this internal surface be formed by an extremely thin membrane, or by a scarcely concrete substance, they may become detached almost as soon as formed; but if the internal surface be composed of a firm membrane, or some tenacious substance, they may be retained, as in the instance last referred to, and even acquire the semblance of a peduncular connection amongst themselves or with the parent cyst.

Causes which influence the detachment of young hydatids.

The inferior or junior cysts, as well as the superior, have a lamellar structure, present no uniform striæ, and are perfectly spherical. I have, however, met with exceptions to the two latter characteristics. In a case of acephalocysts which occurred amongst my inspections, several of these bodies, instead of presenting a spherical figure, exhibited a sort of hour-glass contraction; by which, however, the acephalocyst was not divided into two equal cavities, but, commonly, a small portion was imperfectly insulated. In some

Structure of acephalocysts.

Varieties.

specimens, the contraction was slight; and in others, more profound. It was very evident that this contraction depended on the outer layer of which the laminated coat of the acephalocyst was composed; since, on the removal of this layer, the contraction disappeared. This peculiarity was noticed in several of the acephalocysts found in one subject; and I think I have met with the same appearance, to a less degree, in other cases. The appearance which I have next to notice, I have seen only on one occasion. A very few of the acephalocysts, having rather more than an inch in diameter, presented opaque white lines; which, after taking a straight course, bifurcated once or twice, each branch forming a similar angle with the line from which it proceeded, and pursuing a direction forwards without forming either curve or angle. I was unable to form any opinion, whether these lines depended on a canal or not; nor can I offer any conjecture respecting their nature.

Some of the secondary acephalocysts are slightly milky or opaline: others are perfectly transparent, and capable of answering completely the purpose of a lens. They occasionally appear to have been produced at different times, or to have advanced with different degrees of rapidity. By the united effect of the growth of these cysts, the parent cyst is finally burst, and dies.

Amongst a collection of hydatids, it is by no means uncommon to find some which appear to have lost their vitality, and to have become collapsed, more or less opaque, and of a yellowish colour. These parasitical animals are supposed to enjoy but a short period of life. The hydatids of pigs and sheep are said to be produced in spring, and to die the following winter. It is certain, however, that in man, either the continued life of individual hydatids, or a succession of generations, will protract, not merely the existence, but the growth of hydatid tumors to a much longer period.

The following case will not only confirm the remark which I have just made, as to the length of time which

Length of
hydatid life.

hydatid tumors may exist, but will also afford some idea of the size to which they may attain, and of the remarkable changes which their slow but progressive growth is capable of effecting in neighbouring parts.

Edward Culham, a man of about forty years of age, of a pale and somewhat sallow complexion, had been ill for a considerable time, and for about a year was a patient in this hospital, under the care of Dr. Cholmeley. His abdomen was distended to an extraordinary size, and was considerably indurated, but free from fluctuation. It suggested an idea of inequality, on the hand being passed over it. At the inspection of his body, an opening into the abdomen discovered a large mass of nodulous tumors, of various sizes, and, for the most part, of a light colour. Peritoneal adhesions, together with a loose and vascular cellular web, connected them into a firm unyielding mass, and produced an appearance which was not inaptly compared to potatoes in a net. The viscera were concealed, except some part of the liver, and a few convolutions of small intestines pushed to the left side, and shewing themselves between the tumors, which proved to be formed by acephalocyst hydatids in various stages of existence.

Case illustrative of preceding remarks, inspected 16th of 3d month (March) 1826.

The chest was opened before the state of the abdomen was disturbed. The diaphragm was pressed upwards, especially on the right side, so as to be about even with the fourth or fifth rib. The lungs were healthy; and the pleuræ, with the exception of one spot at the base of the left lung, were free from adhesions. On the right side, an elongated nodulous tumor, in consequence of either the absorption or the separation of the muscular fibres of the diaphragm, had made its way into the thorax, causing a projection of about three inches, tending directly upwards, over which the pleura extended entire. At a corresponding part on the left side, as before stated, there was a remarkably strong adhesion of the lung to the diaphragm; which appeared to depend on an extension of the disease from the

abdomen, although on this side there was no tumor projecting into the thorax.

The chest having been examined, the contents of the abdomen were removed; in doing which, several large hydatid cysts were unavoidably opened. With the exception of the mesentery, no part appeared exempt from the invasion of these parasitic animals. The liver was completely penetrated by them; though it did not appear that there were any isolated and imbedded in its substance, which was soft, and of rather a lighter colour than is usual. Of those which had penetrated it from the surface, several had their contents more or less tinged with bile. One large one, occupying nearly the situation of the gall-bladder, was filled with dark green bilious fluid, mixed with the broken cysts of smaller hydatids. It was suspected that a cyst had communicated, by ulceration, with the gall-bladder, but that viscus, and both ducts, were subsequently found in a healthy state. The spleen was much enlarged, and deeply penetrated by an hydatid of large size. Several of the same kind surrounded and concealed it. One of these was singular, from being externally of a black colour; which was found to arise from a thin layer of dark red blood interposed between the enclosing cyst and the proper membrane of the hydatid. The contained fluid was limpid, like that in the other cysts. Two cysts, situated behind the stomach, made a considerable projection into this organ, near to the pyloric extremity; but the coats of the stomach were still sound. The pancreas appeared healthy, as did also the structure of the kidneys; but their figure was altered by compression, especially that of the right, which was much flattened and extended. They both contained numerous small lithic acid calculi. The ureters were much enlarged, more particularly the right. Hydatids of considerable size appeared completely to fill the pelvis; but the bladder was found healthy, and even seemed to have admitted of a considerable degree of distension. The mucous membrane of the intestines was

generally of a darkish colour, but presented nothing like ulceration. The whole abdomen appeared altogether void of fat.

The acephalocysts found in this case so completely agreed with the characters which I have already given, that it would be a useless repetition to describe them. Their number was very considerable, and several were of large size. When removed from the viscera, they filled more than half of a large pail. From the difference in their ages and sizes, they presented almost every possible variety, especially in the secondary order of hydatids. In some instances, they were so small, that the primary cyst appeared to contain nothing but a clear fluid, until a close inspection was made, when a multitude of minute vesicles were discovered, resembling grains of fine transparent sand. In other instances, the secondary formations bore a much larger proportion to the fluid in which they were contained, and varied from the smallest size to that of an egg, or even of a large orange; in which last case, they generally contained a third order. In other instances, again, the inferior cysts, instead of floating in the fluid of the parent, had appropriated the whole of it to themselves, assuming the appearance of a mass of grains, somewhat like the pulp of a pomegranate.

The circumstance, that acephalocysts are sometimes met with singly, though of large size, whilst in other instances they are very numerous, has led to the idea that this constitutes a specific character. The solitary species has been called the eremite, and the other the social hydatid. I confess that I doubt the propriety both of the division and of the name. I cannot imagine that the mere fact of an hydatid not containing a group of junior hydatids should distinguish it as a species from other hydatids, which it resembles in form and texture, but which contain a larger or smaller number of young ones. The term eremite signifies an inhabitant of a wilderness, and therefore can be little applicable to an hydatid.

Groundless
distinction
between
eremite and
social hyda-
tids.

I am aware that I should be stepping out of my province, were I to digress into remarks of a therapeutical character; but so little is known as to the method of eradicating these animalcules, when they have gained possession, that I may be allowed to notice some indications as to treatment, which we may collect from an examination of the mode in which nature occasionally effects a spontaneous cure.

Process of
nature in
the sponta-
neous cure
of hydatids.

This she does in two ways: 1st, By forming a communication between the cyst containing the hydatids, and either the surface of the body, or the intestinal canal, or some other cavity, as, for example, the urinary passages, by which they may be evacuated. Or, 2dly, the animal dies: its fluid is absorbed; and its membrane is folded and shut up, as an inert foreign body, within the outer cyst which contracts upon it. A complete instance of this process was seen in a case which I inspected some time after that which I have already related; and in which, the puckering of the surface of the liver was perfectly analogous to that of the surface of the lung after the extinction of a tuberculous cavity. It has been supposed by some, that nature employs the ossification of the enclosing cyst as the means of effecting the death of the hydatid, and of shutting it up as an extraneous body, when dead; but I am rather inclined to believe, that the deposition of bony matter seldom, if ever, takes place until the hydatid has either died, or become perfectly stationary as to growth. When hydatids are formed in the liver, it appears that nature often employs the bile as the means of procuring their death. This fact, which first attracted my attention in a third case which I inspected in this hospital, I find confirmed by subsequent cases, and by numerous scattered observations in which the circumstance has been stated merely incidentally. It does not appear that any one has noticed it as a general fact.

Remedial
measures of
art.

Cures might doubtless be obtained by art, in both of these modes. Several instances have occurred in which

hydatid tumors have been cured by means of incisions, which have given exit to their contents; but, in other cases, such incisions seem to have accelerated the fatal termination. Dr. Seymour, in his work on the diseases of the ovaries, has quoted from a case in which tapping was successfully employed for supposed ovarian dropsy. The history contained ample internal evidence that this was really an instance of hydatid tumor; and therefore probably lodged in the peritoneum forming the mesentery or folds of the broad ligament. The extraction of the proper hydatid cyst, which was of large size, and effected with some difficulty, was an important element in the successful management of this operation.

I have heard that some remarkable cases of abdominal tumor dependent on hydatids have been successfully treated by Dr. Recamier, one of the physicians at the Hôtel Dieu. From symptoms, with which I am not acquainted, he was induced very confidently to diagnose the existence of hydatids; and he steadily persevered in directing the repeated application of caustic, until the sac was opened, and the acephalocysts allowed to escape. Hydatids have been evacuated, and the patient cured, under the influence of a saline purgative: and Laennec, having noticed that sheep affected with vertigo dependent upon hydatids of the genus *cysticercus* are cured by feeding in salt marshes, has been led to recommend baths and fomentations containing a solution of muriate of soda, in cases in which the presence of hydatids has been known or suspected. He supports his views by the detail of several successful cases; yet the efficacy of this mode of treatment must so much depend on cutaneous absorption and transudation through the subjacent tissues, that, notwithstanding my veneration for the author, I cannot but be sceptical with regard to it. The diffusible nature and the anthelmintic virtues of turpentine, and of Deppel's oil, might entitle them to a trial, both internally and externally. It might also be made the

subject of experiment on inferior animals affected with hydatids, how far the simple acu-puncture, or the more powerful electro-puncture, might succeed in procuring the death of the hydatids, and the cure of the affected animals without the expulsion of the cysts.

Of course, an operation for the evacuation of the contents of a tumor dependent on hydatids can only be attempted where the tumor is not of very large size, and where it is likewise situated favourably for the operation. It is equally obvious, that the death of the hydatids themselves will be an event rather to be deprecated than desired, when, as in the case of Culham, they are very numerous and widely diffused.

Abscess occasionally follows the death of hydatids.

I have already observed to you, that hydatids have been found in almost every tissue and every organ of the body. As I shall have occasion to particularize such cases in treating of the different tissues, I shall not take up your time by speaking of them at present. I believe that it sometimes, though very rarely happens, when an acephalocyst hydatid tumor has existed for a length of time, and passed into an apparently quiescent state, after the death and contraction of the hydatid membranes, and when the enclosing cyst of condensed cellular membrane has been converted into a dense, feebly-organized, ligamentous structure, and even become loaded with earthy matter, that; its connection with the surrounding natural tissues being by some cause or other materially injured, inflammation and softening succeed in the adjacent structure, and so may give rise to a species of abscess. Two cases which have come under my notice, proved of an indolent and chronic character, and brought the patient to his grave. On examination, a cavity was found in the liver, containing much soiled and offensive pus, mixed with the remains of the enclosing cyst, completely detached, and forming a large ragged shred of condensed cellular membrane. In one of these cases, the detached cyst contained much bony matter,

and was deeply stained with bile. The hydatid membranes themselves had completely disappeared. Both of these instances occurred in the liver; and I am not aware of similar phenomena taking place in any other organ.

2. OF FLAT WORMS.

These worms have soft bodies more or less compressed, and heads furnished with two or more sucking pores, which in some are armed with points, but in others are naked. They have no abdominal cavity; and their digestive apparatus consists of one or more ramifying canals, terminating in blind extremities, and commencing in the sucking pores. Their ovaries, which are branched, are often proportionally very large and distinct.

Description
of flat
worms.

The bothriocephalus and the tæniæ are the most remarkable of the flat worms. The former worm was, at one time, classed among the tæniæ; but it has been detached from that order by Bremser, who has placed it in another genus. I think, with Blainville, that the distinction is valid, on account of the important differences between them; which will be mentioned in the description of these animals.

Classes of
flat worms.

The bothriocephalus latus, formerly called the tænia lata, is the largest species of flat worm. Though very common in Russia and Switzerland, it is rarely met with in this country. It is often twenty, and has sometimes exceeded a hundred feet in length. The head has two naked openings. The articulations near the head are small and short, resembling transverse striæ: those which follow are also short but broad, and the last are elongated. The articulations are furnished with pores; which are placed in a single, or, at times, in a double row, near the middle of the articulations, on one of the flat sides. These pores appear to belong to the genital organs. This worm is sometimes nearly an inch in breadth. It is extremely obstinate, and often resists the most powerful means which are employed for its expulsion. Intestinal worms of the

Bothriocephalus latus.

species bothriocephalus are said, by Bremser, to infest fishes and aquatic birds.

Tænia solium.

The *tænia solium*, or ver solitaire, as it is erroneously called, there being often more than one in the same subject, is the common tape-worm of this country. It appears to be found in most parts of Europe, except those in which the bothriocephalus latus is common, and has been observed in Egypt. Its head has four pores, in the centre of which there is an obtuse armed proboscis. Although we often look in vain for the head of the *tænia*, except when we find the worm in the intestines after death, yet it sometimes happens that the head is voided from the bowels, or ejected by vomiting. The articulations, with the exception of those near the head, are longer than they are broad.

Tænia in the contracted state.

Tæniæ are believed to grow longer, by their joints increasing in length, rather than by an addition to their number. They present, however, differences in their length, which are not to be ascribed to difference of age. I believe that few persons are aware of the remarkable appearance which the *tænia* assumes in its most contracted state. I had no idea of it myself, until I received an interesting communication on the subject from Dr. Barlow of Bath. He informed me, in a letter dated the 25th of 10th month (October) 1830, that, about a year before, after his usual visit to the United Bath Hospital, he was about to leave the establishment, when one of the nurses hastened to shew him a worm which had just been passed in a stool by a patient affected with acute rheumatism: it was about five inches long, of a dark colour, and marked by numerous rings. Not recognising any thing which he had ever before seen, he directed it to be set aside, until he had an opportunity to examine it. It was, in his presence, put into one of the porringers used for bleeding, together with a little water to prevent its becoming dry; and then committed to the care of the apothecary's assistant. The next

day, on calling for the porringer, he was not a little astonished to find, instead of his acquaintance of the preceding day, a large mass of unfolded tape-worm, of considerable length, white, flat, jointed, and in every respect such as patients affected with *tænia* so often present to their medical attendants after the successful exhibition of a vermifuge. Though the Doctor was not aware that he had ever met with a description of the *tænia* in the state in which the one just mentioned was shewn to him, he supposed that it might have been described by elminthologists; but had sought in vain for such a description, when he sent his account to me. He was therefore induced to believe that the living tape-worm possesses the form and characters of the worm just described, as it was first seen; that its evolution is consequent on the death of the animal; and that naturalists generally have been led into error, by taking their accounts from the worm when dead, in which state it is almost always seen. On perusing the Doctor's letter, I immediately recollected having read, in Bremser's work, that the flat articulated worms are elongated by the lengthening, rather than by the multiplication of their joints; and also, that I had myself observed in some cold-blooded animals, the salmon for example, small and short worms, with heads resembling those of the *tænia*, which I had supposed to be young *tæniæ*. The fact, that we find in animals recently killed, flat worms, such as the *tænia*, the *bothrioccephalus*, and the *bothridium*, elongated as we generally see them in preparations, appears to me to be a proof that that state is not merely a post-mortem appearance, but equally natural to them with the contracted state in which the subject of Dr. Barlow's interesting communication was voided. The short form cannot, on the other hand, be merely a state of youth, as I had been led to imagine from the remark of Bremser. The rapid change in Dr. Barlow's worm is incompatible with such an idea. On referring to Bremser, I found that he speaks of these worms in the contracted and

elongated states, but without mentioning the particular difference between the two. On stating to our friend Dr. Addison the circumstance related in Dr. Barlow's letter, he informed me, that he had once taken from a dead subject, a worm in the same contracted state as that described by Dr. Barlow, and that, having left it, a similar transformation took place. I once found, in making an inspection, a considerable portion of tape-worm in its elongated state, and still alive.

Evacuation
of tæniæ.

The tænia is a very obstinate worm, and sometimes attains to more than ten feet in length. It is generally found in the small intestines, accompanied by abundance of mucus of an unhealthy character. Although it often resists the most powerful purgatives for its expulsion, it seems that certain states of the system are favourable to its coming away spontaneously. I have observed that this appears to be the case in fever; and the fact, that the worm mentioned by Dr. Barlow was voided by a person labouring under acute rheumatism, tends to confirm this view.

Tæniæ
endemic.

Tæniæ, like many other worms, appear to be endemic, or to attack the inhabitants of particular districts. I have been informed by my friend Dr. Knox, that our troops which were stationed in and near the Cape were generally infested by these animals. Many animals, besides man, are much incommoded by them. This is particularly the case with the dog and cat.

Fasciola or
distoma, or
fluke-worm.

Though the bothriocephalus and the tænia are the principal classes of flat worms found in man, yet others are occasionally met with. The fasciola or distoma, or douve, has been observed by several pathologists. Malpighi and Bidloo found it in the liver—Wepper and Pallas, in the hepatic duct—Chabert, in the evacuations of a girl—Bulholz, in the gall-bladder; and Brera, like his countryman Malpighi, in the liver of a person affected with scorbutus and dropsy. These worms, called also douve and fluke-worms, are common in the livers of sheep, especially, it is

affirmed, of those which are fed in marshy districts and are affected with the rot; but they are found in sheep under other circumstances. They appear to be larger in sheep than in man. They are hermaphrodite; and are said mutually to impregnate each other, like snails.

The polystoma is, I believe, the only other species of flat worm found in man. It has six orifices. It is said to have been seen in the ovaries, and also in the veins; but this last statement is doubted, and apparently with good reason. It is met with in the urinary bladder of frogs, and in the branchiæ of fishes. They have marginal pores, which are placed sometimes on one side, sometimes on the other; but they do not alternate regularly. The articulations are very apt to separate from each other, and come away with the alvine evacuations, in the form of small fragments, which, from their resemblance to melon seeds, have been called cucurbitini.

Many other species of flat worms are met with in the lower animals. Three snakes of the Boa kind, which I have seen dissected in this country, were all invaded by parasitical animals; amongst which was a peculiar species of flat worms described by Blainville, and termed by him Bothridium. The head is divided into two portions or lobes. This animal seems very nearly to resemble the Tricuspidares, which are mentioned by Cuvier as affecting the perch and some other fishes.

There is in the Museum a specimen of flat intestinal worm found by my friend Bracy Clarke in the colon of a horse. Its head in some respects resembles that of the tænia; but its body, as well as its articulations, are extremely short, and unlike those of any tænia which I have seen. I believe it to be the *Alyselminthus perfoliatus*, described by Blainville in the article 'Vers' of the *Dictionnaire des Sciences naturelles*.

3. OF CYLINDRICAL WORMS.

It now remains for me to speak of the cylindrical worms,

which are placed by Cuvier in his order of Cavitaires. They are therefore possessed of a much higher degree of organization than the animals of which I have already spoken. They constitute the division of Entozoa Nematoidea, in the arrangement which I have employed.

Characters
of cylindrical
worms.

The cylindrical worms present an elongated, round, and elastic body. Their integuments are more or less furnished with muscular fibres. In general, they are transversely striated. They have an abdominal cavity, in which floats an intestinal canal furnished with a distinct mouth and anus. They have likewise distinct organs for the two sexes, which are found in different individuals. They have not hitherto been discovered to possess any vascular system, and Rudolphi doubts their having a nervous system; but Cuvier thinks that they have a nervous ring surrounding the mouth, from which two nervous cords are prolonged throughout the whole length of the body, running by the side of each other. The intestinal canal is generally straight, and pretty large. The œsophagus is often slender; and in some species, the stomach is marked by the greater capacity and strength of that part of the canal. The internal organs of generation consist of very long tubes, which contain the semen or ova, and open externally, at different points in the different genera.

The genera which, from their occurrence in man, will claim our principal attention, are the *Ascaris*, the *Oxyuris*, the *Trichocephalus*, the *Filaria*, and the *Strongylus*.

Of the as-
carides.

I shall speak first of the *Ascarides*, as the most important. Only one species of this class is met with in man: but if we have recourse to the inferior animals, most of which they likewise infest, we shall find that the species are very numerous. They have round bodies, tapering at the extremities. The mouth is furnished with three fleshy papillæ, from the midst of which there is occasionally protruded a very short tube. In all those which have been dissected, the intestinal canal is straight. The females are much more

numerous than the males. They have a single ovary, which is divided into two branches. It is many times longer than the body; and the external opening to its single oviduct is situated towards the anterior quarter of the body. In the males there is a single seminal tube, which, like the ovary of the female, is much longer than the body. It communicates with a penis, which in some instances is either double or bifid. The penis is protruded from the anus, which is situated near to the extremity of the tail.

The *ascaris lumbricoides*, or the *lumbricus*, as it is vulgarly called, is found, without any manifest difference, in man, the horse, the ass, the zebra, the quagga, the ox, and the pig. It has two longitudinal furrows, which are situated opposite to each other; and the intestinal canal and the genital organs may sometimes be seen through the integuments. The *ascaris lumbricoides* is said to have been seen upwards of fifteen inches in length; but its average length is about seven or eight inches. It is slender and tapering at both extremities, but is rather the most so at the head. The males are generally smaller than the females; and from their tails, which are curled, there sometimes projects a double penis.

*Ascarides
lumbricoides.*

It has been stated, that the size of these worms bears some relation to that of the individual in whom they are found: for example, that they are smaller in children than in adults. Though I believe, from my own experience, that this assertion is founded on accurate observation, it is by no means rigidly and invariably true. For, although the lumbricoid *ascarides* which we meet with in children are generally below the average size, they are occasionally very large.

These worms are sometimes found in very great numbers. I was present at the examination of the body of a boy, who died in La Charité with symptoms of fever accompanied with gastric irritation and some degree of peripneumony, in whose small intestines between fifty and sixty

Numbers in which these worms are found.

of these worms were found. The mucous membrane in the part where they were situated was quite pale. In two places, intussusception had taken place; but even then, the intestine did not appear discoloured, though in one of the places five or six inches must have been received. In the stomach, the duodenum, and the commencement of the colon, where no worms existed, the mucous membrane was partially of a light bright red.

Seat of the
ascarids.

The *ascarides lumbricoides*, when found in post-mortem inspections, are generally met with, as in the case which I have just related, in the small intestines, which are probably their natural habitation. At times, however, they are either carried or make their way into the large intestines, and are voided with the stools. At other times, in opposition to the peristaltic action of the intestines, they gain the stomach; and have even been known to make their exit from the mouth or nostrils. Instances are more rare in which these worms have escaped from the body by preternatural openings. I remember however to have seen, when I was attending the hospitals in Paris, a female, advanced to a little beyond the middle age, who had parted with several of the *ascarides lumbricoides*, from a very small artificial anus, situated near to the external abdominal ring. This patient had been affected with hernia. Since that time, the phænomenon has again come under my notice.

Symptoms
produced by
the pre-
sence of the
*ascarid*lumb.

The presence of these worms is often attended with so little inconvenience, that no symptoms are noticed, to induce the suspicion of their existence. Frequently, however, there is not merely the convincing evidence furnished by the occasional passage of a worm, but, also, general disturbance of the health, emaciation, an insupportable sensation of faintness at the epigastrium, fætor of breath, and those various local irritations which, like the irregular and fantastic movements in chorea, are sympathetic with the irritation of the alimentary canal. Pinel noticed a pain of this kind in and about the ancles, and, in one instance, in

the hand, which accompanied the presence of these worms in the cases of mucous fever, which occurred as an epidemic at the Salpêtrière.

It might probably be remarked with reference to all intestinal worms, but it seems to be notably true with respect to these, that a morbid state of the alimentary canal is connected with, and favourable to, their production and growth. Hence no class of persons are more subject to them than cachectic children. I have observed that the lumbricoides, as I have already noticed with regard to the tænia, are accompanied by an abundant secretion of unhealthy mucus. It is often thick, viscid, and opaque, bearing some resemblance to thick milk. Pinel has noticed their not unfrequent concurrence with that form of fever to which he has given the name of 'mucous,' from its being accompanied by a depraved and increased secretion from the mucous membranes, and to which he remarks that persons of the lymphatic temperament are most liable. This remark of Pinel is in accordance with the observations of Rhœderer and Wagler on the mucous epidemic which occurred at Göttingen. Broussais lays particular stress on the necessity which there is for a morbid, and, as he believes, an inflammatory state of the intestinal mucous membrane, as an essential condition in the propagation of intestinal worms. I have heard him, in his Lectures, interdict anthelmintics; and order that the gastro-enteritis should be treated, as the worms would be unable to exist in the healthy mucus.

The oxyuris vermicularis, which is the most common of all the intestinal worms, next claims our attention. Great numbers of these worms exist in the same individual. Children are particularly liable to be infested with them, but adults are by no means exempt. They are often present, without causing inconvenience, or giving rise to any particular symptoms; but they not unfrequently excite intolerable itching about the anus, and induce hæmorrhoidal

State of intestine in which worms are present.

Cachectic children.

Oxyuris vermicularis, formerly termed ascaris vermicularis.

Symptoms of its presence.

Character
of the oxy-
uris vermi-
cularis.

tumors. Sometimes they produce, sympathetically, a constant gnawing pain in the stomach, accompanied by an almost insupportable faintness. It is this circumstance which has led to their having been sometimes called ‘maw-worms.’ They have been known to excite great irritation about the neck of the bladder; and some cases of satyriasis have been attributed to them. The oxyuris vermicularis seldom exceeds half an inch in length. The head is blunt: the anterior part of the body is the largest. In the male, the tail is crooked and obtuse: in the female, it is straight and flattened; and becomes so fine, that the extremity can scarcely be perceived without the aid of a glass. In the female, which is oviparous, the oviducts completely surround the alimentary canal. The seminal ducts of the male have not yet been seen.

Its seat.

The general residence of the oxyuris vermicularis is in the large intestines, but particularly in the rectum. They are said, however, to have been found in the small intestines, and in the stomach, or in a sac formed in its parietes. These cases are however doubtful; and still more so are the stories of their having been found in the œsophagus, and even in the ventricles of the brain. From the too prevalent ignorance of medical men with respect to this as well as most other branches of natural history, it is highly probable that some other worms, or the larvæ of flies, have been mistaken for oxyures.

Propagation
of these
worms.

The oxyuris vermicularis is an active little animal; and not unfrequently leaves the intestinal canal, and is found on the surface of the body. On quitting the rectum, they have been known to take up their abode in the pudenda. The mode of invasion of most of the intestinal worms is very mysterious; but the habitual residence of the oxyuris vermicularis being so near the surface, together with the facility with which they move when out of the body, renders it by no means difficult to conceive their transfer from one individual to another. Facts are not wanting

to support the probability of this actually taking place. These worms have been known to affect the different members of a family, in a way which was readily accounted for, by different individuals having made use of the same bed.

Of the oxyures which infest rabbits and mice I can say nothing, having never seen them. The oxyures which are found in the rectum of the horse are by no means uncommon, and have probably been seen by most of you. They appear to excite a great degree of pruritus about the anus; but are most likely to excite attention, from the circumstance of their occasioning a remarkable, light yellow, concrete substance to collect about and disfigure the fundament.

Oxyures in the lower animals.

The trichocephalus—or trichuris, as it was formerly called, the head having been mistaken for a tail—is the round worm to which I shall next call your attention. It is thick posteriorly; and slender, like a thread, anteriorly. This slender portion is terminated by a round mouth. There are several species of trichocephalus; only one of which, the trichocephalus hominis, or dispar, is met with in man. It is about two inches in length, only one-third of which is taken up by the thick part of the animal. This portion has a spiral form in the male; which is furnished with a small penis, protruding from near the tail. In the female, which is oviparous, the thick portion is straighter, and is simply pierced at the extremity. On the continent, it would seem that this is the worm which is met with the most frequently in the human intestines. Indeed, some of the most distinguished elminthologists state that they scarcely ever fail to find them. The large intestines are their principal seat, but more especially the appendix vermiformis of the cæcum. Though I have frequently and carefully sought for this worm, I have only once been able to find it. In this instance, it was lodged in the mucus filling the appendix of an emaciated and cachectic girl, who had been much

Trichocephalus or trichuris.

exposed to want and hardship. The trichocephali, as well as the ascarides lumbricoides, were very frequently met with by Rhæderer and Wagler, during the epidemic at Göttingen.

Filariaæ.

Filaria
Medinensis.

The filariae are another family of round worm; of which, more than one species appear to infest man. They have a long, slender, thread-like body, pierced before by a round mouth. They are principally met with in cavities which do not communicate externally—in the cellular membrane, in the substance of the muscles, and in the parenchymatous structure of the viscera. The most remarkable of these is the filaria Medinensis, or Guinea-worm. It is very common in hot climates, where it is found insinuated under the integuments, chiefly about the legs. It attains to the length of ten feet or upwards: it is about the thickness of a probe, and is pointed and hooked at the extremity. It would appear, from some authors, that it may remain for years without exciting any great degree of pain or uneasiness. When one of the extremities makes its appearance, the negroes—for the treatment is very much left to them—secure it by means of a small piece of stick, with a slit in it. They carefully abstain from the use of any considerable force in order to extract the worm; but rather suffer it to be gradually drawn out by the light weight of the stick, round which they wind the worm as fast as it comes out. In this way the extraction is often protracted for several days. When the worm unfortunately breaks, it probably dies; since it is apt to excite great local irritation, and produce troublesome abscesses. By some, these worms are supposed to be introduced into the system by drinking the impure water of the districts in which they are met with. By others, they are said to be conveyed from one individual to another: and it has been believed by many persons that they are the larvæ of an insect. The fact is, that we have no more acquaintance with the mode in which they enter the system than we have respecting the origin of most of

the intestinal worms. For want of sufficient zoological knowledge in the observers, these worms have been confounded with the gordius, a slender hair-like worm found in fresh water, in mud, and on inundated grounds. There is so much of the improbable and obscure in the accounts recorded respecting worms in some respects resembling the Guinea-worm, under the different appellations of dracunculi, chætea, gordius, furia infernalis, &c., that, without further means of gaining information respecting them than I am likely soon to possess, I shall neither enter into the question myself, nor trouble you with it.

Another species of filaria has been described as occurring solitarily in the lungs of persons labouring under phthisis, and is called the filaria bronchialis; or, by Treutler, who has given the principal description of it, the hamularia lymphatica; or, by Rudolphi, the hamularia subcompressa. It is an extremely rare worm; and, by some, the existence of such a species is doubted. However rare or doubtful the existence of filariæ may be in the lungs of man, worms, probably belonging to this family, are occasionally found, in great numbers, in the lungs of some of the inferior animals. I have seen very many of them in the lungs of two specimens of boa or python which died in this country. The lungs were at the same time very much affected with tubercles. These worms possessed, in a remarkable degree, that strong tenacity of life which is conspicuous in many of the filariæ. Though one of these boas was not examined till after decomposition had made considerable progress, the worms were perfectly lively; and one of them, which I removed from the body, continued to live for many days in a small quantity of water placed between two pieces of glass, one of which was concave. In the lungs of one of these boas, my friend Thomas Bell and myself found another species of worm, which is clearly not a filaria; but to what family it should be referred I am not able to say. It bears some resemblance to a polystoma figured by Blainville.

Filaria
bronchialis.

Other
classes of
round
worms met
with in man.
The strongylus
gigas.

Besides the three families of round worms of which I have been speaking, some other kinds are occasionally, though very rarely, met with in man. Of these, the *strongylus gigas* is the most remarkable. It is described as the largest of all the intestinal worms; and is said to be two or three feet, or even more, in length, and as thick as one's little finger. The most frequent seat of its development is one or other of the kidneys, though it has been found in other organs. It is met with in different animals, as the dog, the wolf, the marten, and, at times, in man. When found, it is coiled up, distending the organ in which it is situated, and occasioning the destruction of its glandular structure. Strongyli of this species have sometimes passed off by the urethra, whilst they were yet of small size. They are generally of a bright red: they have six papillæ around the mouth: the intestine is straight: the ovary is simple, from three to four times the length of the body, communicating externally by an opening situated a little behind the mouth, and by its other extremity reaching to the anus.

In the Transactions of the Medico-Chirurgical Society, Lawrence has given a very interesting case of a female, who from time to time voided many hundreds of small worms from the urinary bladder. It does not appear quite clear, whether they were a species of strongyli, or constituted a new species, for which the name of *spiroptera hominis* has been proposed.

Strongylus
equinus.

There is another species of strongylus, which, though not found in man, deserves a short notice. This is the *strongylus equinus*, or *armatus*. It is about two inches in length: the head is hard and spherical; and the mouth is surrounded by small soft spines. It is the worm of the most frequent occurrence in the horse. It penetrates even to the arteries, in which it causes aneurism. It is found also in the mule and the ass, and is perhaps more common in this last than in the horse.

A small species of parasitical animals has lately been discovered affecting the muscles of voluntary motion, amongst the fibres of which they have been found generally dispersed over the body. They consist of very minute cysts, of an oblong figure, in size and colour bearing considerable resemblance to the young of pediculi attached to the hair of persons of dirty habits. When examined with a lens, these little cysts are seen, in many instances, not to be perfectly ovoid, but to be irregularly contracted towards one extremity, so as to form a sort of short and imperfect neck. It is also not uncommon to find some opacity towards one or both of the extremities. They are placed in the direction of the fibres; and are lodged in the cellular membrane immediately investing the muscular fibrillæ, or the tendinous fibres to which they are attached. When the specimen is sufficiently recent, one, and sometimes two thread-like worms may be discovered coiled up in each of the cysts. This little worm was first seen by that indefatigable and talented naturalist Richard Owen, who has minutely and carefully examined it, and who regards it as somewhat allied to the eels found in paste and vinegar. He has given it the name of *trichina spiralis*.

The *trichina spiralis*.

The first observation of these little bodies, with which I am acquainted, was made in 1828, by my friend and former assistant, H. Peacock; who, considering it as a remarkable affection of muscular structure, made a dry preparation of the sterno-hyoideus, to exhibit it. In this state, the true nature of the affection was neither known nor suspected. A short time after, my friend J. Hilton observed two or three cases in the dissecting-room at Guy's, and drew up a good account of its occurrence, and of the various appearances presented by the cysts; but the enclosed worm remained undiscovered, although the cysts had been carefully examined by J. J. Lister; the specimen being either too far decomposed, or otherwise unfavourable to the examination. J. Hilton's paper, accompanied with illustrative drawings,

Discoverers
of this
worm.

Seat of the
trichina
spiralis.

was presented to the Medical and Chirurgical Society, and there read; but its publication was suppressed by the Council. At a later period, some cases of trichina occurred at Bartholomew's Hospital, and furnished the specimens described by Richard Owen and Dr. F. J. Farre. Two or three examples of trichina have since been met with at Guy's; and the organization of the little worm has been seen both by R. Owen and J. J. Lister. They have also been observed in Edinburgh, in the dissecting-room of my friend Dr. Knox, who has given an account of it in the Edinburgh Medical and Surgical Journal. The trichina appears to be wholly confined to the muscles of voluntary motion, and to the tendinous fibres immediately connected with them. In these situations they are often very numerous. Having found them in the same case in every muscle of the body which I examined, even to the lumbricales of the foot, I looked for them in the œsophagus. Not a trace of them was to be discovered: they stopped abruptly at the lowest contractor of the pharynx. This fact, which I have subsequently found confirmed by the observations of Dr. Knox, may be added to others which distinguish the contractile fibrous coat of the alimentary canal, and of some other cavities, from true muscular structure. I ought to observe, that the heart, notwithstanding its undoubted muscularity, was free from the trichinæ.

No symptoms have hitherto been observed as pathognomonic of the presence of trichinæ. Though they have been repeatedly found in cachectic subjects, this has not been invariably the case. It appears that the minute cysts enclosing the trichinæ may become ossified or earthy, like those which enclose dead hydatids. This state is probably assumed when the worm has died and become invisible; Richard Owen having in vain sought for the worm in such cysts. It is probable, that extreme youth, or other circumstances, may also render the worm invisible; since, though often easily discovered, it escaped observation in

the first case examined by J. J. Lister ; and it has repeatedly been sought for, without success, in other cases mentioned by Dr. Knox.

A small worm, but little larger than the trichina, has been found in great numbers beneath the mucous membrane of the alimentary canal in the horse. It has been described by Dr. Knox, who conjectures that it may be allied to the trichina, although it wants the cyst ; but I am inclined to think that Richard Owen is correct in regarding these worms as minute specimens of the *strongylus armatus*.

I must not quit the subject of entozoa without noticing the microscopic and very remarkable animalcules discovered in semen. They have been particularly investigated by Prevost and Dumas ; who state, that they are to be found in the semen of all animals capable of propagation, but that they are absent in that of the mule, and that of other animals who may be sterile from age or season of the year. Very slight differences are noticed in the seminal animalcules of different species ; but they all agree in having slightly oblong and flattened heads, with lengthened tails, tapering so as to become nearly or quite invisible with the best glasses : they possess active powers of motion, and are evidently endowed with sensation. No trace of organization has yet been discovered in them, probably on account of their extreme minuteness. Whether essential to generation or not, they may be regarded as the parasites of the tubuli seminiferi. They are called *circoria seminis*, by Richard Owen, who classed them with the trichina.

Seminal animalcules.

A great number of feigned and imaginary complaints have been referred to parasitical worms : and as those by whom the deception is intentionally practised not unfrequently endeavour to confirm their assertions by the production of worms which they represent to have come from the body, it becomes the more necessary that medical men should make themselves acquainted with the characters and

Presence of worms frequently feigned or imagined.

appearance of the true intestinal worms; and that they should be aware, that not merely common lumbrici, and other extraneous worms, are at times passed off as intestinal, but, also, that worm-like bodies are manufactured out of sheep's intestines, and exhibited by quacks in proof of the efficacy of their remedies.

PARASITIC INSECTS.

Parasitic
insects.

Parasitical animals belonging to the class of insects have so little connection with appearances met with on inspection, that I shall only hastily glance at them, for the sake of completing the subject. Many of them—as, for example, the various species of pediculi or lice—follow in the train of filthy idleness, and render it the inflictor of its own just punishment.

Pediculus
humanus
corporis.

Of the pediculi there are three principal species:—1. The *pediculus humanus corporis*, or body-louse. Though a careful attention to cleanliness is, in general, a sufficient security against these odious insects, it is a remarkable fact, that some individuals, in spite of the greatest attention, are constantly annoyed by these vermin. This peculiarity appears to run in families; an illustration of which is said to exist in one of the first aristocratic houses in this country. Particular districts are peculiarly infested with them. To this day they may be numbered amongst the plagues of Egypt. 2. The *pediculus capitis*, as its name implies, affects the head. And, 3. The *pediculus pubis* confines itself to spots covered by that particular kind of hair which makes its appearance at the period of puberty. A distinguished naturalist of this country, who was making the study of insects an object of his particular attention, by way of experiment lodged one of these insects in the hair about the pubes; but unfortunately lost sight of the incident, until his attention was recalled to it, by discovering that his whiskers had been colonized by a prolific detachment from the mother country.

Pediculus
capitis.

Pediculus
pubis.

The *pulex irritans* or flea, and the *cinex lectuarius* or bug, are too well known to require any description. In this country they are comparatively a trifling inconvenience, which, by care and attention, may be either wholly averted, or rendered scarcely perceptible: but in more southern latitudes, as I can myself testify, they become a source of inevitable and serious annoyance. The *pulex penetrans* is an American insect, and is much more formidable. It makes its way under the skin of the hands and feet; where it not only continues itself, but deposits its eggs, which are rapidly developed, and produce small tumors, which occasionally lead to serious and even fatal ulcers. When they have taken up their residence, they are dexterously detached by the negroes.

Pulex irritans, and cinex lectuarius.

Pulex penetrans.

Several species of *acarus* likewise affect the skin, either simply attacking the surface, or penetrating beneath it. It was long since conjectured, that that odious affection called the itch depended on the presence of an insect of this species; but such unsatisfactory and erroneous descriptions were given of it, that the fact has been generally doubted. It has, however, been recently fully confirmed by the labours of Renucci, a Corsican physician, who graduated in Paris last year. The insect in question, to which he has given the name of *acarus scabiei*, is so small, as to be only just perceptible to the naked eye. Cutaneous affections, resembling the itch in man, but peculiar to some of the inferior animals, such as, the horse, the sheep, and the cat, have likewise been shewn to depend on *acari*, by Bosc, Walz, Gohier, and others.

Acarus.

Acarus scabiei.

The *æstri* are the most remarkable of the parasitic insects; but as they are wholly confined to the inferior animals, I shall say very little respecting them. They belong to the class of *dypterous* insects; and pass the state of larva and chrysalis, or that of larva only, in the body of the animal on which they prey. Different species are found attacking different animals: some, as the horse-botts, inhabit the

Æstri.

alimentary canal: others, as the botts of the sheep and the stag, the frontal sinuses and other cavities: others, as the *œstri* of the ox and the rein-deer, take up their abode under the skin. One species, the *œstrus equi*, deposits her eggs about the knees and shoulders of the horse, where they may be within the reach of his tongue; so that he becomes himself the principal agent in introducing these parasites into his system. The eggs of the *œstrus hæmorrhoidalis* are deposited about the lips of the horse.

Cuterebræ.

The *cuterebra*, a genus found by my friend Bracy Clarke, is also dyptherous, and closely allied to the *œstri*. They are found on rabbits in America, and, notwithstanding the smallness of the animal on which they prey, are large insects. They take up their abode under the skin. Those who are desirous of studying this branch of the subject will find much new and interesting matter in the work of my friend Bracy Clarke; whose labours, on this and various other subjects connected with the natural history and economy of the horse, are of great value and importance. The mode of propagation of the horse-botts is very curious; and deserves some attention, as illustrating the expedients to which nature has recourse, in order to convey the germs of animals into the nidus suited to their developement.

How do parasitic animals enter the system?

I shall now revert to the consideration of the mode in which parasitical animals enter the system. In the case of the horse-botts, which I have just related, investigation has been repaid by the most satisfactory and conclusive results; but with respect to the diffusion and propagation of the entozoa, the difficulties are much greater. The *oxyuris vermicularis* is, perhaps, the only species of whose transfer from one individual to another we have any decided proofs. In the absence of evidence, conjecture has been by no means inactive. Some have supposed that the animalcules which exist as entozoa in man and other animals also exist in other situations, under different appearances; and that their forms are changed when they become parasitic. This

supposition appears to me to be extremely unsatisfactory and improbable; and I think I could as easily believe Ovid's *Metamorphoses*, as become a convert to such a doctrine. The great obscurity which hangs over the subject, the difficulty of accounting for the entrance of the germs into the system, and the extremely low degree of organization possessed by a few of these animals, have induced some naturalists to cut the knot; and either to call in the assistance of spontaneous or equivocal generation, or to deny the possession of a separate vitality to some of the classes of parasitical animals, and more particularly to the hydatid. Some have almost as gratuitously contended that such animals are propagated by germs of invisible minuteness, which, pervading every thing, are taken in with our food, and with the air which we breathe.

I confess my inability to clear up a question of such difficulty. I think, however, that we may be guided by analogy, and need not despair of our researches being ultimately successful.

I have remarked, that the extreme obscurity in which the origin and propagation of some of the parasitical animals, which infest the most deeply-seated parts of the frame, is involved, has induced some pathologists and naturalists to adopt the idea, that, instead of being produced by germs or ova derived from individuals of the same genus, they are the result of spontaneous or equivocal generation. Although there appear to me to be strong reasons against adopting this theory, in the case of most, if not of all our parasitical animals, yet the idea of the production of a new species, or, in other words, spontaneous or equivocal generation, is not to be wholly rejected, without some examination. We have strong facts, to shew that the production of distinct species of animals of the higher classes has not been limited to one spot of the earth, or to one period of time. Different parts of the surface of the globe have their distinct and peculiar animals, as well as vegetables. Many animals are found on

Spontaneous or equivocal generation.

the American continent of the ruminant and carnivorous classes, as well as of the Rodentia and Pachydermata, which are quite peculiar to that continent. In Australia we find a still more distinct production of animals, constituting the class of Marsupialia, and comprising numerous divisions. I am unable to conceive any other explanation of this fact, than the natural conclusion, that the several groups of animals were created in the regions in which they are found, and were there adapted to their peculiar localities.

Arguments
to shew that
spontaneous
generation
is not im-
possible.

The evidence of the creation of animals having taken place at different times, is at least as conclusive as the arguments which I have just adduced in favour of their production on different parts of the globe. The researches of the geologists have shewn us the remains of numerous animals once inhabiting the earth's surface, but now extinct. The researches of similar labourers have shewn, that at the time that these animals possessed the earth's surface, those animals with which we are at present acquainted, with some few exceptions, did not exist. It is not merely one, but several changes, with respect to the species of animals inhabiting it, which the surface of our globe has witnessed. Let it not be supposed that these facts, which extend our view of the operations of creative power, can be applied to man, or that they in any degree militate against the authenticity of the Mosaic record. I have merely adduced these facts to shew that the creation of organized beings has not been limited to one spot or to one period; and that therefore it may not be unreasonable to suppose, that even now new species may be called into existence: but it would have the tendency to damp our zeal in the investigation of the operations of nature, and turn us aside from the acquisition of truth, were we gratuitously to call in the assistance of such a theory, to solve difficulties like those which obscure the propagation of parasitical animals. Indeed, the facts of the case are strongly opposed to the admission of this theory with respect to them. We have seen that the different ani-

mals have their peculiar parasites; and in the case of *tænia solium*, and *bothriocephalus latus*, that, in different regions, a different species of parasites attacks the same animal; but having recognized these different species, we find the same species occurring with strict uniformity of character in a great multitude of individuals; which seems to compel one to admit the probability that they are derived from a common origin, and are propagated by generation; since reference to spontaneous generation would almost necessarily pre-suppose the multiplication of species as well as of individuals. With respect to some of the parasitical animals of which the mode of diffusion was once obscure, we now possess conclusive and satisfactory evidence. The labours of Bracy Clarke have done this for the several species of horse-botts; and no doubt can remain respecting the passage of the *oxyuris vermicularis* from one person to another.

I cannot conclude this Lecture without remarking, that the subject of parasitical animals forms a point at which the limits of our science are adjoining the confines of Natural History. In this respect it resembles the study of the *Materia Medica*: and I would unite my voice with that of your distinguished teacher of that department, in strongly urging you to take advantage of the valuable Lectures delivered by my friend Thomas Bell; and to cultivate the science of Natural History, not merely as one most interesting in itself, and most intimately connected with your own, but because, more than any other, it calls forth the exertion of those faculties of the mind on the strength and activity of which the attainment and cultivation of our profession essentially depend. The honour and reputation of our country, in some sort, demands it of you: for whilst our numerous, large, and widely-scattered colonies, and our yet more extensive commerce, give us unrivalled facilities for placing the whole surface of the terraqueous globe under contribution to this science, we have allowed ourselves to

Parasitic animals, a connecting link between Pathology and Natural History.

be outdone by our neighbours, even in that very element on which repeated triumphs have given us, what those who glory in warlike exploits regard as a proud prerogative; we have neglected the more worthy objects of ambition; and have left its rich zoological treasures to be explored and appropriated by others. I can think of no more powerful means for removing this opprobrium from our country, than for all our medical men, but especially those who are likely to go abroad, to make themselves more or less masters of some of the various branches of Natural History.

LECTURE VIII.

 ON THE

ADVENTITIOUS SEROUS MEMBRANES.

DISTINCTION BETWEEN THESE STRUCTURES AND HYDATIDS INSISTED ON.—DIVISION OF CYSTS INTO THOSE FORMED AROUND BODIES ALREADY EXISTING, AND THOSE WHICH SECRETE THEIR OWN CONTENTS—CYSTS OF THE LATTER CLASS, WHICH ARE TO BE DISTINGUISHED FROM ADVENTITIOUS SEROUS CYSTS.—ADVENTITIOUS SEROUS CYSTS DIVISIBLE INTO TWO ORDERS, THE SIMPLE AND COMPOUND—DESCRIPTION OF SIMPLE ADVENTITIOUS SEROUS CYSTS, AND MENTION OF THE SITUATIONS IN WHICH THEY ARE FOUND—COMPOUND SEROUS CYSTS, MOST FREQUENTLY FOUND IN THE NEIGHBOURHOOD OF THE UTERUS—THEIR CHARACTERISTIC IS THE PRODUCTION OF INFERIOR CYSTS ON THEIR INTERNAL SURFACES—VARIETIES OF FORM WHICH THESE INFERIOR CYSTS PRESENT : 1. THE INTERMEDIATE FORM, REGARDED AS THE TYPE OF THIS FORMATION—PHENOMENA PRESENTED BY THESE INFERIOR CYSTS, AS, *ex.gr.* RUPTURE OF THE PARENT CYST, INFLAMMATION, &c.—2. THE PEDUNCULATED FORM OF SECONDARY CYSTS—PHENOMENA PECULIAR TO THIS VARIETY—CASES TO ILLUSTRATE THE FIRST AND SECOND FORMS OF INFERIOR CYSTS.—3. THE FLATTENED, BROAD-BASED VARIETY OF SECONDARY CYSTS—PECULIAR FEATURES OF THIS FORMATION—ILLUSTRATIVE CASE—CAUSES WHICH INFLUENCE THE FORMATION OF OVARIAN CYSTS AND THEIR EXTRAORDINARY SIZE—IRRITATION WHICH THEY EXCITE IN THE SURROUNDING PARTS—COMPOUND SEROUS CYSTS IN THE TESTICLE, OR PSEUDO-HYDATID TESTICLE—COMPOUND SEROUS CYSTS IN THE FEMALE MAMMA, AND IN THE EYE.

GENTLEMEN,

YOU will recollect, that before the last Lecture, which was devoted to the subject of parasitical animals, we had for some time been taken up with the consideration of the morbid appearances presented by the serous and the synovial membranes. We had, however, almost wholly confined ourselves to the examination of those membranes of the serous class which naturally exist as an essential part of our frame. It still remained for us to examine those serous membranes which are occasionally found in various parts of

the body, as the result of an irregular or accidental production. The bladders, sacs, or cysts which constitute some of the forms in which these adventitious membranes are met with have been so often confounded with other circumscribed collections of fluid generally known by the name of hydatids, and, by most, supposed to be possessed of a separate and peculiar vitality, that a description of true hydatids, and an examination into their nature, appeared to me to be an essential prelude to the consideration of the adventitious serous membranes in question. This, as I have already explained to you, was my principal inducement for making a temporary digression into the subject of parasitical animals, to which the investigation of the nature and habits of true hydatids or vesicular worms, in my opinion, essentially belongs. Whether you are disposed to go with me thus far or not; whether you admit the existence of a separate life in those perfectly-detached, spheroidal bladders which have been called acephalocysts, and which are possessed of such an astonishing power of multiplying their species; or whether you prefer the opinion of those who are unwilling to concede to them the attribute of an independent life; the importance of a marked distinction being drawn between them and the adventitious serous cysts, of which we have now to treat, will remain absolutely the same. I am induced to lay the stronger stress on this distinction, from the circumstance, that one or more distinguished pathologists, both by theory and practice, by precept as well as by example, have taught that the distinction was a mere verbal quibble. I trust, Gentlemen, that you have retained in your memories a sufficiently lively recollection of the characters of true hydatids, of their mode of production, of the changes which they undergo, and, above all, of the influence which they exert on surrounding parts, to be fully able to perceive and appreciate the essential difference which in all these respects exists between true hydatids and serous cysts of accidental or adventitious production.

The adventitious serous membranes, as I have already said, have been very often described by pathologists under the name of hydatids: and, without at present noticing the confusion into which modern authors have fallen by the use of this term, I cannot give a better idea of the vagueness with which it has been employed, than by observing, that Lecat declared that the eye was a perfect hydatid, and that an hydatid was an imperfect eye. The membranes in question have also been designated cysts; but this term has been used in as vague a manner as the word hydatid; and though, in many respects, it is a very convenient one to express generically the envelopes of various fluids and other matters occasionally found in the body, still some further definition must be given, when we wish especially to point out particular sacs, which owe their origin to the adventitious production of serous membranes.

Vagueness of the terms hydatid and cyst, as commonly used.

By some pathologists, cysts have been divided into two classes. The first includes those which are formed about the bodies which they contain, whether these bodies have been produced in the system, or have been introduced from without; examples of which kind of cysts we see in the capsules which shut up bullets, shot, &c., and in the condensed cellulo-membranous envelopes to true hydatids, to the masses of hair and fat formed in the ovaries or elsewhere, and to the remains of tubercles and abscesses. The other division of cysts comprises those sacs which produce as well as circumscribe their contents. The cysts of which I am now to speak, belong to the second division; but, as there are many kinds of cysts to which the definition I have given is equally applicable with adventitious serous membranes, it will be necessary that I should exclude these from the class with which we are at present engaged.

Division of cysts into classes.

So far as I have looked into authors who have treated on this branch of morbid anatomy, there appears to have been so much confusion and obscurity connected with it, as to convince me that it is one of considerable difficulty; and I

Segregation of adventitious serous cysts from other cysts, having some characters in common:

1. from hydatid cysts:

2. from subtegumentary encysted tumors:

3. from cysts formed by the parietes of an obstructed canal:

4. from cysts formed by the distension of natural cells:

must confess that I enter upon it with much diffidence, lest, in endeavouring to point out and avoid some palpable errors of others, I should fall into similar inaccuracies myself. For my present purpose, it will suffice to point out, as briefly as possible, some of those cysts which, having been classed by some pathologists with the adventitious serous membranes, must now be distinguished from them; since they do not participate in the peculiarities which I am about to describe, but are possessed of a pathological character of their own, which entitles them to be spoken of separately.

1. I need scarcely remind you, that the true hydatid is a sac which secretes or produces the fluid which it contains.

2. Various cysts are not unfrequently met with beneath the common integuments, and apparently very intimately connected with them, which contain a sebaceous, melecercitious, artheromatous, or other collection, which is at once both the product of the sac and the cause of its distension.

3. Cysts are occasionally found which secrete the materials contained in them, and owe their origin to canals of which the orifices have been more or less completely obstructed: such are, cysts in the labial glands; ranula; those formed by the dilatation of the lactiferous tubes; and those in the pancreas. To these we may add the cysts so often found on the surface of the kidneys, and occasionally on the liver; which, on account of the delicacy of the structure in which they are situated, we judge, rather from inference than from demonstration, to be occasioned by the obstruction of an excretory canal. Cysts of this kind are sometimes found in the testicle.

4. Other cysts belonging to the class of cysts producing their contents, but not to be confounded with the adventitious serous membranes, are produced by the distension of cells naturally existing in the body, but of which the contents, from unexplained causes, have become morbidly increased, and not unfrequently, at the same time, more or less changed in quality. Of this description are the

enlarged vesicles of De Graeff; which, though very rarely, if ever, so much enlarged as to constitute ovarian dropsy, as some have supposed, are nevertheless frequently met with many times larger than their natural size.

5. Cysts, which, from the description that has been given of them, in all probability produce as well as enclose the fluid found within them, are generally met with in the thyroid gland, when enlarged so as to form the disease known by the appellations of 'goître' and 'bronchocele.' These cells very probably depend on the original structure of the thyroid gland; but we know so little positively of either the structure or the functions of this body, that it would be rash to offer a decided opinion on this point. The sub-cutaneous cellular membrane is occasionally affected with dilatation of its cells at a particular part, giving rise to a tumor made up of cysts, which must be classed in this group.

5. from
cysts formed
in the thy-
roid gland.

Such are the principal forms of cysts which, from the circumstance of their producing as well as enclosing the matters found in them, have in some arrangements been classed with the serous cysts. As it has been my wish merely to point them out on the present occasion, sufficiently to ensure the distinction which I wish you to keep in mind, I shall now proceed with the subject more immediately before us.

The adventitious serous membranes, like those naturally existing in the body, form completely shut cavities. As far as it is in our power to ascertain, they are wholly, or at least with but very few exceptions, the result of an entirely new formation dependent on some anomaly in the function of nutrition, but respecting the precise nature of which we are completely in the dark: and were I to offer any thing respecting it, I could do so only as a conjecture, which I am unwilling to mix up with the facts which it is my desire faithfully to lay before you. On the present occasion; I shall divide the serous cysts into two classes. The first

Division of
adventitious
serous
membranes
into two
classes—
the simple
and the
compound.

comprises those which are simple, and for the most part solitary; but which, if accompanied by one or more similar membranes, owe this association to the accidental circumstance of the same cause which produced the one having likewise operated in its neighbourhood, and not to the sac itself possessing the remarkable property of giving origin to new growths having the same character with itself. Respecting this first class I shall have but little to offer. If there are any of the adventitious serous membranes which can be said to be formed from a pre-existing structure, and not to be the result of a new formation, they are to be found in this class; since it is possible that some of them may have been produced by the distension of one or more of the cells of the cellular membrane, which a partial inflammation, or some other cause, may have shut off from their communication with the adjoining cells. This supposition is the most plausible in the instances of the adventitious synovial bursæ, such as those which are formed upon the patellæ in persons who are accustomed to kneeling, and of the ganglia formed in the neighbourhood of the sheaths of tendons.

Formation
of simple
adven-
titious se-
rous mem-
branes.

Serous cysts of the simple class are formed in various parts of the body. Without entering into a minute description of them, I shall enumerate and describe some of the most remarkable.

Situations
in which
these simple
adventitious
serous
membranes
are formed:
—within
the cra-
nium:

Within the cranium of a female, who had not been observed to present any cerebral symptom, I noticed a thin and delicate serous cyst, perfectly circumscribed, and filled with transparent colourless serum. It was of about the size of a nut; and was situated at the base of the brain, not far from the tractus opticus. Clusters of serous cysts are often found in the plexus choroides; and, notwithstanding their number, I am quite disposed to think that they belong to the class of simple cysts of which I am speaking, since their number does not appear to depend, in any degree, on a disposition in the parietes of these cysts to produce others

of an inferior order. These serous cysts in the plexus choroides are manifestly vascular: they seldom exceed the size of small currants, and are often much smaller: yet, as I have already mentioned, Dr. Hooper has given a plate of a very interesting case of this kind, in which the vascular cysts in the plexus choroides were nearly as large as eggs. It has been supposed that these cysts in the plexus choroides are formed by the dilated extremities of vessels; some persons fixing on the arterial system, some on the venous, and others on the absorbent. It has even been attempted to prove this supposition, by blowing air into these vesicles through the vessels in question: but were the possibility of doing so fully proved, which, after all, appears to me to be very doubtful, it would by no means be a demonstration of the origin which has been attributed to them; since it was long ago shewn, by Meckel, that the *vesiculæ seminales* may be inflated from the veins or absorbents of the pelvis.

Simple serous cysts are occasionally formed in the eye-lids; and, since they constitute a very legitimate subject for surgical operation, they merit particular attention. Some are found along the edges of the tarsi; where they seldom acquire more than a moderate size, and their removal is effected with comparative ease. Those which are situated more completely in the body of the eyelid, and which at times extend pretty deeply into the orbit, present more difficulty in their treatment, and are more serious in their consequences. I remember to have seen a young woman in La Charité, under the care of Baron Boyer, who was affected with a cyst of this kind, of nearly the size of a chesnut. From the depth to which it extended into the orbit, it was not thought expedient to attempt the total removal of the sac. It was hoped, however, that when the greater part had been removed, the remainder might be obliterated by the adhesive inflammation; but, instead of this result being obtained, a high degree of irritative fever

—in the
eyelids;

carried off the patient in a very few days. When these tumors of the eyelids are of moderate size, it is generally recommended to remove them from the inner side of the lid, in order to avoid the disfigurement of an external scar.

—in the
lungs ;

Simple adventitious serous cysts are stated to occur sometimes in the lungs. Laennec mentions one or two instances of this kind ; but says, that they are more frequently met with in the lungs of inferior animals, and in those of the ox in particular, than in those of man. I have never had an opportunity of witnessing a case of the kind myself, and shall therefore not attempt to describe them.

—in the
female
mamma ;

It would appear that the female mamma is at times the seat of simple adventitious serous cysts ; and that the cure of the tumors, to which they give rise, may often be effected by allowing the contents to escape ; after which, adhesive inflammation, either spontaneous, or artificially excited, unites the sides of the cyst, and obliterates its cavity.

—in the
neighbour-
hood of the
uterus.

The most frequent seat of these cysts, and the last of which I shall here speak, is in the neighbourhood of the uterus, but more particularly in the folds of the broad ligament, or intimately connected with the ovaries, if not imbedded in their substance. I have already spoken of these, when I was describing the morbid appearances which are met with on the attached surface of the serous membranes. Cysts of this kind at times acquire a very large size ; and constitute one of the forms of what is commonly called ovarian dropsy.

Second or
compound
class of ad-
ventitious
serous
membranes.

I shall now speak of the second class of adventitious serous membranes, or of those whose parietes present the very remarkable property of producing other cysts of a similar character with themselves ; or morbid growths, which, if they do not present, strictly speaking, the character of cysts, are nevertheless referrible to the same type or mode of formation. Cysts of this kind, like those of the preceding class, are found in different parts of the body ; but they are by far the most frequently met with, acquire

the largest size, and present the greatest variety of appearances, in the neighbourhood of the uterus, but more especially in the ovaries and in the folds of the broad ligaments. I shall therefore commence by describing these; because the large scale on which they may be seen, renders their structure the more easily intelligible. Since this affection, especially when situated in the neighbourhood of the uterus, is not calculated to lead to a speedily fatal termination, we rarely obtain an opportunity of witnessing the early stages of this form of encysted dropsy; but, on the contrary, the external or superior cyst generally acquires a very large size, and gives, in some instances, the most unwieldy dimensions to the abdomen. Although the operation of paracentesis may have shewn that the fluid by which the cyst was at first filled was of a decidedly serous character, it is very materially altered before the fatal termination of the case; when the fluid is often of a mucous, or of a sero-purulent character; and when it frequently happens, that the cyst itself has, to a great degree, lost the characters of a serous membrane. Its parietes appear to be rather fleshy than membranous; and the internal surface becomes more or less generally roughened, as if by ulceration or abrasion. The most important feature which it presents, is the appearance of tumors and elevations, dispersed more or less thickly over the internal surface. These tumors, notwithstanding the very great variety which at the first view they seem to present, are, nevertheless, referrible to one general mode of formation. The forms which these elevations assume are various: and I request your particular attention to the description of them, which I am about to give.

Compound serous cysts most frequent in the neighbourhood of the uterus.

Characters of a compound serous cyst formed about the uterus.

I shall commence with the description of that form which is intermediate between the two extremes; not merely because I shall more readily proceed from this, as a standard, to the explanation of its modifications, but also because the peculiar structure is here the most distinct and intelligible. In this form we observe, on the internal surface of the

Description of the various forms which elevations on the internal surfaces of compound cysts assume:

1. The intermediate form.

principal cyst, more or less rounded elevations, of various sizes, projecting into the interior of the cavity, and covered by a membrane which is continuous with the lining of the principal sac. On making an incision into these tumors, we find that they themselves consist of cysts filled by a secretion, often serous, but almost as frequently mucous. It is not, however, merely by this secretion that the cyst is filled. On looking more minutely into it, we shall generally find that from one or more points on the interior of these cysts there grows a cluster of other or tertiary cysts, upon which is reflected the lining membrane of the cyst in which they are contained. Cysts of the secondary order not unfrequently afford as complete a specimen of a reflected serous membrane as either the pericardium or the tunica vaginalis. The proportion which these contained cysts bear to the cavity of the reflected membrane is extremely various. Sometimes, especially when it is of a serous character, it nearly fills the containing cyst, whilst the bunch of inferior cysts is of very inconsiderable size: at other times, the superior cyst is almost entirely filled by those of the inferior order; in which case, we may generally find that the nodulous or tuberoso elevations which we may have observed on the exterior of the containing cyst are occasioned by the unequal developement of the contained cysts; for those which have grown most rapidly, and attained the largest size, forcibly dilating that part of the superior cyst which is reflected over them, occasion a kind of hernia at that part. It sometimes happens, that the distension occasioned by the growth of the inferior cysts is sufficient, not only to disturb the even surface of the superior cyst, but actually to produce a rupture, which admits both of the escape of its fluid contents, and of the unrepressed growth of the inferior cysts. The inferior cysts themselves are found to contain a serous or mucous secretion; and very often produce another order of cysts, possessing the same character with themselves.

Growth of the inferior cysts may produce nodules externally.

Rupture of the containing cysts.

It is certainly by no means surprising that these cysts of different orders, which sometimes present the appearance of delicate and pellucid sacs filled with clear and colourless serum, and possess the astonishing power of giving rise to an almost innumerable multitude of cysts presenting the same character with themselves, should, at the first view, have been confounded with true hydatids; but it is no less surprising that a little careful inspection did not at once irrevocably remove the delusion: 1st, Because the bunches or clusters of secondary cysts are invariably and permanently attached to, and continuous with, the internal surface of the superior cysts in which they are contained; and, 2dly, Because delicate vessels are seen ramifying from the one upon the other.

Confusion
of these
cysts with
hydatids.

Reasons
why this
error ought
not to have
been com-
mitted.

The cysts which I have been describing as formed on the parietes of the primary cyst at times pour out a part of their contents into the interior of the larger cyst; either, as I have already mentioned, in consequence of an extensive rupture produced by the development of an inferior order of cysts; or by small apertures, which appear to be likewise the result of distension. In both of these cases, but especially in the latter, the opened cysts bear a considerable resemblance to mucous follicles on a large scale; and appear to be the principal source of the very copious and rapidly produced mucous secretion which is a characteristic feature, in many cases, of ovarian dropsy. This mucus bears a very close resemblance to that furnished by the follicles of Naboth; and is frequently so viscid, that it passes with difficulty through the canula.

Extravasation
of the
contents of
the secondary
cysts.

The membranes of which these cysts, whether of the second or third order, are formed, are liable to inflammation. The product of this inflammation, like that of inflammation of the serous membranes naturally belonging to the body, may be either of the plastic or of the inorganizable kind. In the former case, it leads to the formation of adhesions between the close portion of the membrane, or

Inflam-
mation of the
secondary
and tertiary
cysts.

that which constitutes the contained cluster of cysts, and that portion which is reflected over them, forming the parietes of the containing cyst. It is the formation of these adhesions which so frequently renders it difficult to demonstrate the structure which I have been describing. When the product of inflammation is of the inorganizable kind, we find a secretion more or less puriform in its characters. This secretion is sometimes confined in one or more of the secondary cysts: at other times, it finds a way of escape into the interior of the principal cyst, and thus contributes to the variety in the appearance presented by the fluids drawn off in the operation of paracentesis for the relief of ovarian dropsy. This, however, is not to be regarded as the sole cause of the occasional puriform appearance of the fluid evacuated by this operation. It is doubtless, in some instances, to be attributed to the sort of ulceration or abrasion which I have already noticed as occurring on the internal surface of the principal cyst; and which we find, both in that part which is formed by the cysts developed in its parietes, and in that part of the parietes which happens to be free from them; though it is most frequently met with in the former situation.

Puriform
fluid—how
produced.

Such are the most striking characters of that form of cysts which, for the reasons already stated, we may regard as affording the type of the second class of adventitious serous membranes. The circumstance upon which I wish to lay particular stress, is, *the production of more or less numerous clusters of cysts, arising from different points, on the interior of the superior cyst.* The cysts composing these contained clusters have neither the narrow necks nor peduncles which mark one of the varieties into which this species of production declines; nor, on the other hand, those broad and extended bases, and that flat and compressed form, which mark the opposite variety, in which the incysted form, and more particularly the disposition to produce a reflected membrane, is less easily made out.

Distinction
of the cysts
now de-
scribed,
from two
other forms.

I shall next describe that variety which is characterized by slender peduncles. This form presents us with all the gradations, from the form which I have already described, down to the slenderest filaments. I have stated, that it is at particular points on the internal surface of the superior cyst that the clusters of inferior cysts take their origin. It sometimes happens, that the number of cysts forming the cluster is so great, in proportion to the space which they occupy, that, like trees too thickly planted, they interfere with each other's growth. Their developement is more or less limited to an increase of dimension in length; yet, as their free extremities are allowed to diverge, we sometimes find the slender peduncle gradually dilating into a pyriform cyst; at other times, the dilatation does not take place till near the extremity of the peduncle, and it thus produces a cyst more nearly resembling a grape or currant. At other times, no dilatation takes place, probably from the cavity having been wholly obliterated. The pedunculated cysts, or the extreme of this variety in the form of filaments, are either produced singly, but in the closest approximation, from a particular point of the containing cyst; or they may be attached to it by a common peduncle, from which the proper peduncle of each proceeds. These elongated productions sometimes become highly vascular, and, in the defect of an internal secretion, probably contribute largely to that occupying the sac into which they project. Sometimes, on the contrary, they are very feebly organized; and appear ultimately to lose their vitality in consequence of the kind of strangulation which they receive at the narrow neck by which they are attached to the containing cyst. It would appear, that the pedunculated cysts and filaments which have thus lost their vitality are a pretty frequent source of irritation to the serous membrane reflected over them, which constitutes the containing cyst. The product of the inflammation thus excited is of the inorganizable kind; and often forms a thick and grumous substance, which sometimes may

2. The pedunculated form.

Varying forms of pedunculated cysts.

Strangulation of pedunculated cysts.

be washed out from the bunches of the filaments; but at other times these come away with it, in the form of shreds. The bunches of slender pedunculated cysts, and the tufts of filaments almost resembling tassels, sometimes proceed at once from the inner surface of the principal cyst; but they are more frequently met with, growing from the interior of the secondary cysts.

To render the necessarily-complicated descriptions which I have now given more intelligible, I shall relate the particulars of two inspections, which afford examples of most of the peculiarities of those varieties of cysts of which I have been speaking.

Case to explain the slender pedunculated form of cysts.

The body of a patient of Dr. Cholmeley, E. Bindle, who died the preceding evening in Lydia's Ward, was examined 11th of 4th month (April), 1826.

The body was still warm. Emaciation moderate, when the duration of the complaint and the frequent depletion are taken into consideration. The abdomen, as in life, was much distended.

Head not examined.

Thorax.—On both sides, the pleura covering the diaphragm, the base of the lungs, and a considerable part of the lower lobes, bore decided marks of recent inflammation. There was scarcely a trace of fluid in either cavity; but flakes of effused lymph, of an opaque yellow colour, of little tenacity, of unequal thickness, and divisible into laminæ, but without distinguishable signs of organization, were found in both, but more remarkably in the left cavity. There were no marks of more ancient pleuritic inflammation. The lungs were remarkably healthy, with the exception of those parts of the lower lobes which corresponded to the most inflamed portions of pleura, and which were sensibly indurated, but without much alteration of colour: the heart and pericardium were free from disease.

On opening the abdomen, there escaped a considerable quantity of thick, pale yellow fluid, bearing the strongest

resemblance to pus. The intestines, which were much distended with gas, were overlaid with this matter; which seemed to have been poured out over the whole surface of the peritoneum, excepting on the contiguous surfaces of the stomach and colon, and a part of the mesentery. Between some of the convolutions, it was of a more solid consistence, and offered traces of an approach to the formation of adhesions, but without the tenacity requisite for this purpose. There were some old peritoneal adhesions between the liver and diaphragm, as well as between some of the intestines. The omentum was scarcely recognizable: what was considered to be the relic of part of it, existed in the form of a long and slender cord, stretched between the left side of the stomach near to the spleen, and a tumor in the right inguinal region near the brim of the pelvis. The peritoneum lining the parietes was of a grey or even black colour, from carbonaceous matter deposited in its texture, which was a little thickened. The stomach and intestines appeared to be free from disease. The mucous membrane of the stomach was remarkably pale. The liver and spleen offered no appearance of disease; but the former was rather pale.

Connected with the uterus and its appendages were numerous cysts, closely impacted in the pelvis. They did not rise above the brim so much as examination before death would have led one to imagine. The tumor which had protruded from the vulva had retired within the vagina. On laying it open, it was found to communicate with a larger one, situated more internally: both of these, as well as some other cysts, contained pus: their parietes were thickened with appearance of erosion. Others, whose parietes were firm and coriaceous, contained a yellow, grumous, and almost gritty matter. In some, this matter was fluid from dilution. Some contained a thin and delicately vascular cyst, attached by one part to that which contained it, and itself containing a bunch of vascular cysts, somewhat

resembling what have been called placental hydatids, floating in serous fluid. In some, instead of bunches of cysts, there were tufts, more or less enlarged, at their free extremities. Some shewed the transition between these cysts containing serum, and the preceding varieties in which suppuration had taken place; and others contained a dark brown, dirty fluid. The uterus was of its natural size and structure. The Fallopian tubes were pervious for scarcely more than half an inch at the interior extremities. The fimbriated extremities, and the ovaries, were indistinguishable in the diseased mass.

Case illustrative of the intermediate form of secondary cysts.

On the 16th of 12th month (Dec.) 1828, I was present at the examination of the body of a female aged rather more than forty years, a patient of Dr. Stroud. — She had been married late in life, and was the mother of one tolerably fine child; but had latterly lived apart from her husband. She became the subject of a tumor in the lower part of the abdomen, which made her appear as large as at the full period of pregnancy. It evidently contained fluid, and was regarded as ovarian. In the course of a few months, it was repeatedly tapped. After each operation, the fluid very rapidly re-accumulated. The fluid was generally, if not invariably, coloured with bright-red or scarlet particles; but appeared to be otherwise much less charged with animal matters than these secretions usually are. It was in no sensible degreeropy, and scarcely any turbidity was produced by the application of heat. The distension of the abdomen was pretty general and equal; and nothing like a defined tumor could be made out, except that, by attempting to grasp a part of the abdomen between the fingers of one hand, and, at the same time, steadily pressing them into the abdomen, two smaller tumors, of about the size of one's fist, might be decidedly, though not very distinctly, felt.

Some days after her last tapping, the fluid having again accumulated in large quantity, the patient rather suddenly expired.

The body was examined, in the presence of Dr. Roget and Dr. Stroud, by W. Skee and myself. About three-fourths of a large pailfull of fluid were withdrawn from the abdomen, by means of a puncture. The greater part of this fluid bore the character already given; but the sanguinolent tinge was not very bright, and did not appear quite equally diffused; some small portions, occasionally passing through the opening, appearing to have a more mucous, and at the same time a more bloody character than the rest. The last portions were of a dirty brown colour, turbid, and rather thick. On enlarging the opening by which the fluid had been evacuated, a cavity of considerable size was discovered; on the internal surface of which there projected numerous tumors of very various sizes, of a lightish colour, but more or less extensively mottled with red. Further prosecution of the examination proved the cavity to be that of a very large cyst; the parietes of which, except when thickened by the before-mentioned tumors, were in general of about the thickness of a crown-piece. They were very extensively and closely applied to the parietes of the abdomen, to which they generally but slightly adhered. It did not appear to have formed any adhesions to the intestines: hence it was readily removed, with the uterus and its appendages. The tumor appeared to have been formed in, and to have dilated the right ovary; at least, there was nothing else discoverable which could be regarded as the ovary. It was also thought that that part of the tumor immediately adjoining to the broad ligament still retained traces of the structure of the ovary. The right Fallopian tube was stretched in a pretty straight line across a part of the tumor. The fimbriated extremity still retained its natural appearance. The left ovary presented nothing remarkable, except that its corresponding Fallopian tube, which was considerably convoluted, was bound down upon it by cellular adhesions, which were partially coloured by matter of a carbonaceous character. The intestines, both internally and externally, appeared healthy.

The liver was small, and seemed somewhat wasted. Nothing was remarked in the other viscera; but the tumor before mentioned merits a more minute description. It was probably capable of containing about two gallons. Its internal surface presented numerous tumors, yet there was likewise a considerable extent of smooth lining. The upper part of the right side, or perhaps it may be said that the right side generally, was the principal seat of the tumors. The largest rather exceeded the size of one's fist: two or three were as large as an egg: several were somewhat smaller; and very many were, from their small size, more deserving the name of granulations. The larger tumors were of a nodulous or irregular tuberoso figure: they were mottled and vascular on the surface; and appeared to consist partly of an opaque, yellowish white substance, and partly of a more or less clear fluid. When opened, those which were most completely in the form of cysts presented other cysts or tumors within them, over which their own lining membrane was reflected; but their bases were broad, rather than forming peduncles. Some of the cysts contained a clear fluid; but in most it was turbid. In some it was of a light yellow, in others sanious. The nodulous elevations on the larger cysts were evidently occasioned by the growth of the contained cysts, which irregularly distended the containing cyst, the membrane of which was thinnest at these parts. Some of the tumors were principally composed of a more or less consistent, opaque, whitish substance, which appeared to be perfectly insusceptible of organization; but the membranes of the cysts in which it was contained were vascular. These cysts were not generally pedunculated, yet in one or two the radiated structure was indicated. The external surface of one or more of the tumors appeared to be ulcerated, and was partially covered by a layer of substance resembling concrete pus. Besides these tumors, there were on the internal surface of the large cyst several bright-red highly vascular fimbriæ, attached by very short narrow necks, and

forming a sort of tassel, or resembling some kinds of seaweed. They were of small size, the fimbriæ not being more than from one-eighth to one-half or three-fourths of an inch in length. The veins which ramified on the parent cyst were of a very large size. There was a small clear cyst on its peritoneal surface.

I shall now proceed to notice that variety, in which the secondary cysts, so far from being attached by slender peduncles, have that broad attachment and flattened form which, without the assistance of the intermediate gradations, could scarcely be referred to the type which I have drawn. The secondary cysts in this variety, as well as in the two former, are collected in clusters on the parietes of the superior cyst; but they appear to produce a circumscribed and more or less considerable thickening of the parietes, rather than a prominent tumor, covered by a reflected membrane. They constitute, however, perfectly shut cavities; acquire, at times, a considerable size; contain, in some instances, a serous, and in others a mucous secretion; and produce in their parietes inferior orders of cysts, having, like themselves, broad bases and flattened forms. From the extent of their bases, the secondary cysts in this variety occupy proportionably a much larger space on the internal surface of the containing cyst; and, by their developement, although they increase its size, they seem more completely to encroach on its particular cavity. In cutting into a tumor composed of this form of cysts, we may find, it is true, several cavities of considerable size; but we shall probably not find the greater part of the fluid collected into one principal cavity. Hence, in this variety of ovarian dropsy, fluctuation is often obscure, and the relief afforded by paracentesis only partial and trifling. I am not aware that the secondary cysts in this variety ever lose their vitality from defect of nutrition; but, if such an effect be ever produced, it cannot be the result of so limited and partial a cause as that which we have seen to operate in the

3. Flattened and broad-based form of secondary cyst.

preceding variety. There is another point of difference, which consists in the arrangement of the subordinate parts, no less worthy of remark, as distinguishing this variety from the two preceding; that is to say, from the standard and the pedunculated variety. In the two last-mentioned forms, in consequence of the limited extent of the spots whence the secondary productions take their rise, they necessarily acquire somewhat of a radiated arrangement; whereas, in the variety with which we are at present occupied, it is difficult, if not impossible, to reduce its internal structure to any definite arrangement.

Case to illustrate
ovarian
cysts with
broad bases.

In the following case, the form of cyst which I have just described was well marked. The body of Jane Rider, aged about forty, a married woman, affected with incysted dropsy of about two years' standing, which had commenced on the right side, and had produced little derangement of health, was examined 9th of 8th month (August), 1827. The abdomen was greatly distended; and fluctuation might be felt, though obscurely. She had been tapped repeatedly (five times); but the quantity of fluid withdrawn, which was ropy, muciform, and very characteristic, was by no means proportioned to the size of the tumor. She sank rather rapidly after the last repetition of the operation.

The head was not opened.

With the exception of some elongated, filamentous, pleuritic adhesions on the right side, which were arranged along the course of the ribs, the thoracic viscera appeared quite healthy.

On laying open the parietes of the abdomen, the tumor on which the distension of the abdomen depended came into view. It filled the pubic region; and extended above the umbilicus, towards the epigastric region. It was immediately in contact with the parietes. Even the omentum was at the upper and back part of it. Its surface was somewhat uneven; and might be characterized as large, flat, and reniform. It was evidently composed of numerous cysts, the septa

between them being in many parts distinguishable through the general covering. Its peritoneal surface was pretty generally red, and highly vascular. The peritoneum lining the parietes was in the same state, where opposed to the surface of the tumor. In the abdominal cavity there were several ounces of discoloured sanguinolent fluid, apparently mixed with some of the mucus from the cysts. There was nothing like the formation of recent false membrane accompanying these appearances of inflammation. The old adhesions which the tumor had contracted were very limited, when compared to the extent of the surface. They were almost, if not wholly, confined to the iliac regions, and to the upper part of the right side. The tumor appeared to have taken its origin in or near the left ovary. The uterus, which was about its natural size, was carried considerably to the right. Its left side was rather elongated, and the Fallopian tube and round ligament even drawn out by the tumor over which they were stretched. The right ovary was slightly enlarged, mammellated, and very vascular. The tumor, when cut into, was found not to consist, as is often the case, of one principal cyst; but was made up of a very considerable number of a moderate size, containing a mucous secretion of various degrees of thickness and transparency, which in a few of the cysts was much discoloured. In the parietes of all the principal cysts were developed innumerable small cysts, not pedunculated.

The mucous membrane of the stomach was, in some parts towards the cardiac extremity, of a brownish colour, and was easily separated from the subjacent coats: that of the duodenum was of rather a leaden hue. In other respects, the abdominal viscera were tolerably healthy.

Although we may observe the three well-marked forms which I have now described in ovarian serous cysts of the second class, and though for the most part each individual case more particularly affects one or other of these forms, yet it sometimes happens that two, or all three, may be

The three forms described may be exemplified in one cyst.

found in the same superior cyst. Even then, however, one form seems to predominate.

Causes of
the produc-
tion of ova-
rian cysts.

There appears to be an hereditary disposition in some females to the production of the serous ovarian cysts. Even in these cases they are mostly unaccompanied with any constitutional taint; that is to say, other parts of the body are not simultaneously affected with similar productions. It is even more common for one ovary to be singly affected, than for both to give origin to this form of cysts: nevertheless, it does sometimes happen, that we meet with cases of double ovarian dropsy; but in many, if not in most of these, there is likewise a complication with some one of the diseases commonly called malignant, of which I am shortly to speak. It is by no means easy to say what are the exciting causes of this form of ovarian dropsy. Though, in many instances, the patients refer the commencement of the disease to parturition, yet it is far from being uncommon for unmarried or barren women to labour under this affection. The tumors and growths allied to ovarian dropsy, to which I shall presently call your attention, as formed in other parts of the body, can often be referred to some mechanical injury; but, in the case of organs which appear to be so well protected as the ovaries, it is more difficult to conceive of the possibility of such an exciting cause. Something may possibly be ascribed to the natural and periodical changes which these organs, in common with other parts of the female genital system, doubtless undergo. The escape of vesicles, which may take place in virgins, is necessarily attended with a degree of lesion which may be the exciting cause. I have already stated my objections to regarding these tumors as degenerations of the vesicles of De Graef.

Large size
of the com-
pound cysts
formed
about the
uterus —
how ac-
counted for.

Another circumstance which deserves some consideration and inquiry, is the larger size and greater abundance of the contents of the cysts formed in and about the ovaries, than those of similar cysts formed in other parts of the

body. Two or three causes, I presume, mainly contribute to this result. The first which I shall mention, is the obvious fact, that the system, on which, in the case of ovarian dropsy, the cysts are implanted, is naturally disposed to obey a stimulus which requires an increased supply of nutritive matter, and which gives rise to a proportionally rapid growth. In the next place may be mentioned, the abundant supply of blood which these parts habitually receive: and thirdly, and, as I believe, principally, must be noticed the position of these parts, situated in the abdomen, and consequently exempt from all pressure or restraint calculated to limit their developement.

This last point appears to merit an additional attention, from the suggestions which it excites in relation to the operation of paracentesis for the relief of this form of dropsy. So long as the distress and inconvenience of the patient will allow us to defer the operation of paracentesis, it is, doubtless, desirable to do so; since even the pressure which the full sac itself is able to exert on its contents must have a tendency both to diminish the rapidity of secretion, and to retard the growth of the inferior order of cysts. It is well known, that the oftener the operation has been performed, the shorter is the interval which elapses before a repetition is required; and at last, a quantity is produced in the course of a very few weeks, as large, if not larger, than that which had been many months in accumulating, prior to the first operation.

The next and last point of which I shall speak, in connection with ovarian cysts, is the degree of irritation which they occasion in the surrounding parts. This irritation is generally, in the early stages at least, remarkably slight: indeed, it is very probable that it can scarcely be said to exist, until some of the causes have been brought into action, which I formerly described as producing inflammation, or death of a part or parts of the adventitious growth. I have frequently been astonished at the comparatively

Therapeutic indications dependent on locality.

Irritation of the contiguous parts occasioned by ovarian cysts.

Extirpation
of the ovary.

slight and recent peritoneal adhesions by which some of the largest ovarian cysts have been attached to the neighbouring organs. This circumstance is not only a striking feature of difference between this affection and others closely allied to it in structure, but it is of the utmost practical importance with reference to the only mode of treatment hitherto devised, which is at all adequate to the cure of the disease—I mean, the absolute extirpation of the affected organ. Though this must necessarily ever be a most dangerous and formidable operation, I can see no insuperable obstacle to its practicability, provided it be performed at an early stage of the complaint. Of course, it must be desirable, when any idea is entertained of performing this operation, to abstain from paracentesis, or any other measure which may have a tendency to produce adhesions between the external surface of the principal cyst and the parietes of the abdomen.

Compound
serous
cysts in the
testis.

Adventitious serous cysts assuming the form of reflected membranes are also met with in the male organ corresponding to the ovary; that is to say, in the testicle, where they constitute that affection which has been designated, by some, hydatid testicle. After what I have already said respecting the confusion of serous cysts with true hydatids, which are sometimes found in the testicle, it is needless that I should again point out the decided characters which distinguish these two forms of cysts. The serous cysts which are developed in the testicle are very far from attaining the size of those which are produced in the ovaries; yet at times they distend the testicle to a larger size than it acquires under any other disease—fungus hæmatodes, perhaps, alone excepted. Like the affection of the ovary, of which we have been speaking, this encysted disease of the testicle appears to be unaccompanied by any constitutional taint; and when the affected organ has been removed, the patient has not been troubled by any return of the complaint. This disease is much more rare than the corre-

sponding disease in the female; and I am not aware that any observations have been collected which tend in the least to shew that there is any thing like an hereditary predisposition to this affection. It seems probable, that in some countries it is endemic; and if we have been correctly informed by navigators, the inhabitants of the Isle of Tinian appear to be much subject to it. It is stated, that very many of the inhabitants of this island are affected with enlarged testicle; and that extirpation, which is said to be sometimes performed by the patient himself, is employed for the cure. The disease is not mentioned as of that serious character which would warrant us in supposing it to have been of what is called a malignant nature. In the encysted disease of the testicle, the fluid bears so much less a proportion to the solid parts than is the case with the encysted disease of the ovary, that it affords an easy transition to those tumors, which, though for the major part solid, nevertheless affect the structure and bear the closest resemblance to, if they are not absolutely identical with the compound serous cysts, the formation of which I have been describing. In fact, the difference between them, so far as the proportion between the fluid and solid parts is concerned, appears, as I have already hinted, to be very much influenced by the degree of pressure to which the exterior of the adventitious growth is subjected.

Pseudo-
hydatid
testicle,
endemic.

There are two other situations in which the class of adventitious serous membranes, with which we are now occupied, is occasionally found; and respecting which, from the predominance of the fluid parts in the cysts, it may be proper for me to say a few words, before I proceed to the consideration of those growths which, from the predominance of the solid parts, are more commonly styled tumors.

The female mamma, and its immediate neighbourhood, are occasionally the seats of the adventitious formation of serous cysts assuming the form of reflected membranés. They bear the closest resemblance to those which I have

Compound
serous
cysts in the
female
mamma.

already mentioned as occurring in the testicle, and have, in consequence, with equal inaccuracy, given rise to the appellation of 'hydatid breasts.' The cysts formed in a breast thus affected contain bunches of secondary cysts, and a fluid sometimes serous, sometimes very nearly resembling synovia, and at other times of a mucous character. This affection does not appear to be accompanied by any constitutional taint, or to be at all malignant in its nature, the disease being wholly removed by the removal of the part. I shall not dwell longer on this form of disease; since these cysts are generally accompanied by others, which give rise to a more solid structure.

Compound
serous
cysts in the
eye.

Bunches of cysts are occasionally formed in the eye. They are more interesting, from the importance of the organ which they affect, and from their situation, so remarkably favourable for the inspection of their progress, than from the size to which they attain. They cannot, however, fail to excite very serious apprehension; since, in their commencement, it must be difficult, or even impossible, to distinguish them from the commencement of a malignant disease. Though they should not present this character, and therefore not endanger the life of the patient, they will at times completely deprive him of the use of the affected eye. The production of these cysts in the eye may be sometimes clearly traced to external violence: at other times, the exciting cause is more obscure. There was, some time since, a patient in the London Ophthalmic Infirmary, in the anterior part of whose eye two or three serous cysts had formed, in consequence of a small penetrating wound which he received through the cornea. For some time they continued to sprout, notwithstanding the operation which had been performed for their removal; but I have been since informed that the apprehensions entertained respecting this lad have proved groundless, and that the eye was returning to its former integrity. A case, which I take to be similar, was related some years ago to the Medico-Chirurgical

Society :—A small circular body, resembling a cyst, was seen floating in the anterior chamber of the eye, and attached by a slender peduncle to a part of its parietes. It was considered to be an hydatid: an operation was performed for its removal, and I rather think that complete success was obtained. Though this case was regarded as one of hydatids, it appears to me to be sufficiently evident that the little pedunculated body which excited so much interest belonged rather to the class of adventitious serous membranes. One of the forms of staphyloma, which is regarded as in no degree malignant, appears to be essentially composed of a collection of cysts; and, as far as I can judge from mere description, having never had an opportunity of examining a case of the kind myself, is connected with that form of adventitious serous membrane with which we are now occupied.

LECTURE IX.

ON THE

GENERAL CHARACTERS OF MALIGNANT DISEASE.

GENERAL CHARACTERS OF MALIGNANT DISEASE.—MEANING OF THE TERM 'HETEROLOGUE'—FOUR DIVISIONS OF HETEROLOGUE FORMATIONS—ALL MALIGNANT GROWTHS HAVE SOME CHARACTERS IN COMMON—APPEARANCES PRESENTED ON MAKING SECTIONS OF MALIGNANT TUMORS—APPEARANCES BROUGHT INTO VIEW BY A CAREFUL DISSECTION—EXTERNAL CONDENSED CELLULAR MEMBRANE—INTERNALLY, A SEROUS MEMBRANE WITH REFLECTIONS OVER PEDUNCULATED BODIES—FORMATION OF SEPTA—GROWTH OF SECONDARY CYSTS, AND CONSEQUENCES OF THAT GROWTH—DEATH OF SECONDARY CYSTS, AND EFFECTS PRODUCED BY IT.—FORMATION OF AN ULCER EXTERNALLY—CHARACTER, MODE OF PRODUCTION, AND STRUCTURE OF THIS ULCER.—ON THE FLUID PORTIONS OF MALIGNANT GROWTHS—ON THE SOLID PORTIONS—SOURCE FROM WHICH THE SOLID PARTS ARE PRODUCED—EFFECTS OF MALIGNANT GROWTHS ON SURROUNDING PARTS—INFLUENCE IS EXERTED ON THE CHARACTER OF A NEW DEPOSIT BY THE CHARACTER OF THE PART IN WHICH IT IS DEPOSITED—APPLICATION OF THIS PRINCIPLE TO MALIGNANT DISEASE, WITH ILLUSTRATIONS—DISCUSSION OF THE QUESTION, WHAT IS MALIGNANT DISEASE?—CHARACTERISTICS OF MALIGNANT DISEASE—INADEQUACY OF THESE CHARACTERISTICS—SUMMARY OF THE MOST SATISFACTORY GROUNDS ON WHICH TO FORM DIAGNOSIS—LIABILITY OF CERTAIN STRUCTURES TO MALIGNANT DISEASE—CONNECTION BETWEEN A LOW DEGREE OF VITALITY AND THIS LIABILITY—ON THE DEGREE OF INNERVATION, AS CONNECTED WITH THIS LIABILITY—LIABILITY OF FIBROUS TISSUE AND NON-MALIGNANT TUMORS TO BECOME THE SEAT OF MALIGNANT GROWTHS—INFLUENCE OF JUXTA-POSITION.

GENTLEMEN,

I HAVE now to solicit your particular attention to the different forms of heterologue deposits; which may be referred to the general laws of formation unfolded to you in my last Lecture, when speaking of ovarian dropsy. Allow me to remind you of that part of the arrangement adopted in my introductory Lecture, which relates to adventitious deposits. I remarked, that most of these accidental formations have been called heterologue, to denote their dissimi-

larity from those structures which naturally exist in the body. They are marked by a certain degree of uniformity of character, and more particularly by their mode of formation. Most of them have been styled malignant; and they may be reduced under the four following heads. The first comprises those cases which consist in the production of well-formed cysts, generally assuming the character of reflected membranes, unaccompanied by constitutional taint, and commonly called hydatids. These may be considered as typical of the order at the head of which they are placed; and I have already detailed their most striking characters. The second division comprehends true scirrhus: yet it must be confessed, that it is very difficult to say, in all cases, whether this term is applicable or not, since the natural boundaries are most indistinctly marked between this and some other members of the family. The third division comprises fungus hæmatodes, fungus medullaris, medullary sarcoma, fungoid disease, spungoid inflammation, cerebri-form cancer, &c. The fourth division comprises melanosis in that particular form which exhibits a structure resembling the preceding classes. The term 'melanosis,' as descriptive of a particular specific affection, has been, by some, restricted to growths possessing a certain anatomical structure. To these may be added cirrhosis, and gelatinous or gum cancer.

Division of
adventitious
growths
into four
classes.

1. Adventitious cysts.

2. Scirrhus.

3. Fungoid disease.

4. Melanosis.

Laennec has remarked, that the older surgeons, and, in imitation of them, the modern anatomists, have confounded, under the name of cancer, scirrhus, and carcinoma, accidental productions, which have no common characters, except either their having no analogy to the structures naturally existing in the body, or their being produced in a state of firmness or crudity, and tending to destruction by a process of softening. I am very far from wishing to set aside the discrimination between the different forms of malignant diseases. We owe much to Laennec, for the distinction which he powerfully contributed to introduce. At the same

Various
meanings of
the terms
'scirrhus,'
'carcinoma,'
&c.

X

+ see Guy's Reports Vol 3 p 243 - Dr. Bright's case

time, I am persuaded that there are certain points of resemblance, by which the affections known by the different names which I have enumerated are most intimately and, as a family, inseparably connected together. These common points of resemblance, which are chiefly dependent on structure, and appear to have been very much overlooked, not only by Laennec but by many others, constitute the characters which I shall endeavour in the first place to point out. Having explained these, I shall proceed to notice what I conceive to be the structural and other peculiarities of each division: and I shall take a cursory review of some of the opinions and doctrines which have been advanced on this subject.

Characters
of malignant
tumors.

The tumors of the description of which I am now speaking have a more or less rounded form. On making a section of them, they present various appearances; but are all more or less divided by septa, which affect sometimes a radiated form, and at others a cellular character. Both of these characters have been insisted on by many writers on this subject; but I believe the differences which have been observed, depend, in many instances, on the direction in which the sections are made. The mode of examination by means of section, if it be the only one employed, is not better adapted for the investigation of these tumors, than for that of the brain. The objection to it is increased by the plan of immersing the specimen in alcohol, which is sometimes had recourse to for the purpose of hardening the parts. By this measure, we coagulate the fluids, render opaque the transparent parts, and consequently, by masking the boundaries of structure and arrangement, destroy two of the most important characters which assist the examination. It is on this account that almost all the preparations which I have made myself, or seen made by others, are more or less unsatisfactory, and, even in the most successful cases, fall incomparably short of the inspection of the recent specimen.

Common
errors in the
mode of
examining
malignant
tumors.

If we carefully dissect down to the surface of one of these tumors, we shall usually find that it has a capsule or covering; which has, I believe, generally been supposed to consist of the altered and condensed cellular membrane of the parts which have given way before the growth of the tumor. This idea is probably correct with respect to the unequally-thickened external part of the capsule: but if we select those tumors in which the process of decay has either not commenced or has made very little progress, we shall find, on a careful dissection, that the surface which is next to the mass of the tumor is more or less smooth and even; and on raising it, we find that it is reflected over one or more somewhat pyriform bodies, attached by a base, which is generally narrow and peduncular, to some part of the circumference of the enclosing capsule. Unless the tumor be very small, it is much more common to find several, rather than a single body of this kind; and, as there is often little if any fluid intervening between them and the enclosing capsule, their form is somewhat modified by their mutual pressure. Sometimes, though more or less closely applied to each other, these pedunculated bodies are perfectly detached at their sides, and may, consequently, be readily traced to the point which forms the common origin of their peduncles. At other times, these bodies are so adherent amongst themselves, and the membrane covering them so tender and delicate, that, without very great care, the arrangement of their structure may be overlooked, in consequence of the pedunculated bodies being broken or torn through, in a different direction from that to which their mode of formation would naturally dispose them.

It must be sufficiently obvious, that the appearance presented by the section of a tumor such as I have just described must be very materially affected by the direction in which the section is made. If it pass through or near to the point at which the pyriform bodies are attached to the enclosing cyst, it must more or less nearly correspond

Appear-
ances seen
in a well-
conducted
dissection.

Different
appearances
produced by
different
sections.

*see British & Foreign Review No 771. A.D. 1841 review
of Walsh on Cancer Page 160 -*

with the direction which some of these bodies take towards the circumference; and their edges will consequently be seen, in the form of radiating lines. On the other hand, if the section be made more or less nearly transverse to the axes of these bodies, their sections will convey the idea of cells of various shapes.

Continu-
ance of the
dissection.

Formation
of septa.

If, continuing the dissection, we raise the outer cyst, or the membrane reflected from that which covers the radiating pedunculated bodies, we shall generally find, that on one or more sides it dips down deeply into the mass of the tumor. It thus forms part of a septum, which separates one packet of pedunculated bodies from the others, which usually concur to form the mass of the tumor; for it, comparatively, rarely happens that the tumor is composed of a single cyst filled with pedunculated bodies. On examining these different encysted packets of pedunculated bodies, we shall often find some indication of their having taken their origin from nearly the same spot, which is generally the most indurated part of the tumor.

Rupture of
the original
cyst by the
growth of
the inferior
cysts.

We may likewise observe, that the different secondary tumors or encysted bundles of pedunculated bodies are in very different stages of progress. In those tumors in which the internal growth is most active, we shall find that a process has taken place perfectly similar to that which I described as occurring in ovarian tumor, when the development of the contained cysts produces the hernia or rupture of the containing one. The secondary cyst, or cysts, which make their way through the containing one, rapidly advance when they are freed from the restraint which its pressure afforded, and thus constitute another tumor, which adds to the original mass. If we examine the structure of this new tumor, we shall find that the subordinate growths of which it is composed, radiate from the point at which this tumor made its escape from the original one. At the same time that the escaped cyst or cysts acquire their more rapid growth, they often assume

a new character with respect to their consistence, which is generally much more soft and tender. The most striking illustrations of this principle are met with in osteo-sarcomatous tumors, which very decidedly belong to the class of which I am now speaking. Whilst that portion, which constitutes the original part of the tumor, and has been formed beneath the pressure of the periosteum, is dense, and more or less loaded with bony matter, that portion which has grown through the openings presented by the distended fibrous tissue is of luxuriant and rapid growth, and is almost wholly composed of soft matter. Those parts of the tumors in which the rapid and unrestrained growth is most remarkable are generally situated near the circumference, where they are exempt from the restraint of mutual pressure, and receive an abundant supply of nourishment from the surrounding natural structures.

Softness of the new growth after bursting the envelope.

A marked difference exists between malignant formations under such circumstances, and others in which development has been restrained or vitality lost by pressure, and, consequently, a defective supply of nutrient matter. I have already explained to you the mode in which pressure, impeded nutrition, and death, are occasioned in those ovarian tumors in which the secondary cysts are thickly crowded, and attached by very narrow peduncles. Precisely the same process takes place in the tumors of which I am now speaking: and when we make a section through one of them which happens to be composed of many secondary tumors, and which consequently presents many centres of radiation, we shall often find that the pedunculated bodies connected with one or more of these centres have lost their vitality by a natural strangulation or ligature; and, also, that the immediately adjoining parts which yet retain their vitality, irritated by that which has now acquired the character of a foreign body, are brought into a state of inflammation. The result of this compound action is the formation of a cavity filled with broken-down and softened matter of a

Causes of the death or impeded nutrition of secondary cysts.

Surrounding inflammation follows the death of secondary cysts.

Hence a purulent depôt is formed: in other words, there is central softening.

Conditions essential to this central softening.

Effects of malignant tumors on the surrounding textures.

Production of an ulcer externally.

Character of this ulcer.

peculiar character, intermediate between suppuration and gangrene. This process very frequently takes place before the exterior of the tumor exhibits any symptom of irritation or inflammation, and, to my mind, very satisfactorily accounts for that disposition to central softening or decay on which Laennec, Wardrop, and some others, have so forcibly insisted, as characterizing the progress of heterologue deposits. At the same time, I think I am correct in stating, that, for the production of this form of gangrene or softening, the supply of nourishment should be pretty promptly cut off by the operation of the natural ligature. When the process proceeds more slowly, the parts which are under its influence gradually acquire an increasingly dense structure, and, ultimately becoming penetrated by earthy matter, are allowed to remain, unproductive of serious irritation, notwithstanding their deteriorated organization and diminished supply of nourishment. Striking examples of this process are met with in the scirrhus tubercles developed in the uterus; and I have likewise seen it in the liver.

Tumors, such as I have described in the course of their developement, produce, by the irritation which they excite, a greater or less degree of thickening of the surrounding cellular structure, and sooner or later become visible externally, dilating the integuments which are stretched over them. The points, at which this distension is the most considerable, are inflamed. The inflammation proceeds to ulceration; and the tumor either sprouts luxuriantly at the part from which the pressure is thus removed, or participates in the ulcerative process; which latter event, for reasons presently to be explained, is that which we have most frequent occasion to observe. The ulcer, the production of which I have described, is worthy of special attention; and has been particularly insisted upon, as peculiarly characteristic of malignant disease. It is universally described as presenting elevated and everted edges; whilst its ragged

and depressed central portion is bathed by an unhealthy secretion, to which the name of pus can scarcely be applied.

The mechanism by which this peculiar ulcer is produced, is as follows. I have shewn that, at the external part of the tumor, its growth is the most luxuriant, both from the want of pressure, and from the increased supply of nourishment. The continued developement and growth of the adventitious structure at the circumference, especially when the skin participates in the affection, will explain why this part of the ulcerated surface is the most elevated. The central parts, on the other hand, have not only to encounter the pressure which they sustain from the surrounding parts of the tumor, and to suffer the diminished supply of nourishment which this pressure occasions, but, moreover, ulceration, having removed the integuments, all supply of nourishment from the surrounding natural structures is necessarily cut off. The depth and irregularity of the central part of the ulcer is often further promoted by a communication being formed between this part of the ulcer and a cavity commenced and produced in the interior of the tumor, by the process which I have heretofore described. We may be easily convinced of the general accuracy of the description, which I have endeavoured to render intelligible, by making a section through a recent specimen of an ulcerated tumor of the kind now under our notice, in such a manner that the section may pass through the diameter of the ulcer. By then carefully dissecting the cut edge of the ulcer, we may almost always find satisfactory evidence that the elevated margin is composed of radiating pedunculated bodies; whilst in the centre, this disposition is less distinct, the structure much more condensed, and there is little, if any, trace of organization; excepting at a few spots, in which inflammation appears to have been set up by the irritation caused by the neighbouring dead parts.

The rationale of the characters above noted.

The structure of this ulcer.

Such, Gentlemen, do I believe to be a correct account of the structure of those tumors, to which the term

‘malignant’ has been applied. The type of all these formations may be seen in the pericardium, or tunica vaginalis : and if you trace out the various modifications of which the simple form of a lining membrane with a reflected portion is susceptible, you will have no difficulty in comprehending the anatomy of malignant growths.

There yet remain a few remarks for me to offer respecting these tumors generally, before I proceed to speak of their different species.

1. With respect to the more fluid parts of these tumors.—Although these generally bear a very small proportion to the solid part, we shall almost always find some fluid present ; which, on close inspection, is seen to be either contained in cells of various sizes, or lodged between the pedunculated bodies and the membrane reflected over them. This fluid is by no means uniform in its appearance and qualities. In that form of tumor which I have taken as the type—in which the encysted structure is the most evident—in which the surrounding parts are the least altered—and in which there appears to be no constitutional taint, the fluid is most abundant, and, more frequently than in the other forms, presents a serous character ; but even in this form we find it passing through various degrees of ropiness, in some of which it very closely resembles synovia, until we arrive at the form of thick and perfect mucus. In some cases it is colourless and transparent ; but it is also met with of a yellow colour, as if tinged with bile. Sometimes it is streaked or spotted with blood, and occasionally it is intimately mixed with blood or cruor. Most of these appearances may be met with before the contained cysts or pedunculated bodies have lost their vitality ; yet the last-mentioned appearance, or that in which the fluid is soiled by cruor, is most likely to occur when this change has taken place. At other times, the fluid contained in those cells in which the inferior cysts or filaments have lost their vitality is yellow, opaque, and puriform, or grumous.

Characters
of the fluid
in different
tumors.

In those tumors which present a very dense structure, bearing a considerable resemblance to cartilage, the fluid which may be observed to exude from those parts of the incised surface at which the vitality of the structure has not been lost, before the removal of the tumor or the death of the subject, is, I believe, invariably of a viscid, mucous character. I wish you to keep this observation in mind, as I shall hereafter have occasion to advert to it. In the present instance it deserves notice, as forming one of the features of resemblance between the tumors with which we are now occupied, and those more manifest serous cysts with the description of which I commenced. I may add, as another point of analogy, that in these dense tumors we often observe small, scattered, yellow, opaque points, presenting the same character with those already described as occurring on a larger scale, where vitality has been lost by strangulation.

Secondly, the differences observable in the solid part of these tumors merit particular attention; since it is on them that the distinctions drawn by pathologists have been principally founded. We find the solid structure presenting every gradation, from an almost stony hardness, to the consistence of the brain of a child, or of weak size. It is not, however, in the degrees of consistency that the only difference exists: there are likewise differences of structure, which appear to depend partly on the mode in which the contents of the cyst have been thrown out, and partly on the susceptibility of organization possessed by the matter effused. In those cases in which the structure on which I have insisted is the most evident, the subordinate pedunculated bodies are well defined; and each is enclosed in a peculiar membrane, although these membranes may be adherent amongst themselves. Collectively, they entirely fill the sac which is reflected over them. They are seen to take their origin from one particular part; and their small, thickened, and feebly-organized membranes principally

On the solid part of malignant tumors.

Differences between the solid parts; and causes of such difference.

constitute the solid part of the tumor. At other times, instead of a bunch of numerous small cysts or pedunculated bodies, the enclosing cyst or reflected membrane, as I have already said, contains very few bodies, or even a single one, of this kind; which, if examined at an early period of its formation, will be seen to bear a close resemblance to some forms of polypi, and to be nearly or quite transparent, but of an amber or sanguineous colour. It appears to consist of tender coagulable lymph, which at times admits of the elongation of vessels into its substance. These vessels ramify, in a radiating form, from the point to which the peduncle is attached; but they seem incompetent to maintain the vitality of the structure in which they are distributed. This structure, as its degree of vitality is lowered, becomes opaque. It is white, and resembles the medullary structure of the brain, if the small vessels of which I have been speaking do not give way; but when they do give way, the blood which they effuse, pervades the opaque matter, and more or less deeply discolours it. I have never met with the last-described appearances, except in tumors of rapid growth, dependent on fungus hæmatodes or medullaris. I am induced to lay some stress upon them; since they appear to me to explain our being sometimes able both to inject large masses of fungoid matter, and, if they yet retain some degree of translucence, to detect, even without injection, a few vessels passing through their substance. I think, moreover, that they tend to reconcile the conflicting opinions which have been advanced respecting the organization of fungoid matter.

Differences
of colour;
and expla-
nation
thereof.

Sometimes
the solid
parts seem
secreted
from the
lining mem-
brane.

Sometimes the more or less solid matter appears to consist of a secretion from the internal surface of the membrane generally, rather than of a growth protruded into its cavity from a particular part of its circumference. In this form, we occasionally meet with a laminated structure, such as is observed in an aneurismal clot. I am not aware that it ever exhibits the slightest indication of organization; though

it not unfrequently becomes infiltrated with extravasated blood. This form, like the preceding, is principally, if not solely, met with in fungoid disease.

Some tumors, which are of an almost gristly hardness, and acquire a considerable size before they pass into the stage of softening or ulceration, appear to be formed on the type of those ovarian tumors which are composed of cysts with broad bases. In these, the radiating structure is but little observable.

Type on which certain hard tumors are formed.

I have seen, in examining cysts, where the structure which I have repeatedly endeavoured to explain was unequivocally present, appearances which are worthy of observation, and which, perhaps, I cannot better introduce than in this place; though it is not easy to say, whether they belong most to the fluid or to the solid part of the structure. The cysts of which I am speaking, contained a substance which may perhaps be best described by comparing it to the crystalline lens, when it has been in some degree softened by decomposition; though rather less uniform than it, both in consistence and appearance. That part which was the nearest to the containing cyst was the least firm and consistent, but the most transparent. It was too transparent and colourless to conceal the firmer interior part, which was rendered distinguishable by a slight degree of opacity, and appeared to consist of a cluster of small pyriform grains; but nothing like a membrane could be distinguished, enclosing them individually, and separating them from the transparent matter in which they were placed. They appeared to be nascent pedunculated bodies, of which the surface had not, as yet, become a concrete texture. This observation appears to possess a two-fold interest. In the first place, it will enable us to conceive how easily the traces of original structure may be lost, when we find them impressed on so tender a material, and which is in contact with a material of almost identical composition. Secondly, we may draw from it a strong presumption, that the cysts of which we have been

Peculiar structure sometimes found in the cysts of other tumors.

speaking, however various may be the forms in which they present themselves, are altogether new formations, and not the result of the extension or developement of pre-existing structures. This deduction tends to confirm the opinion which I have already advocated, that these cysts are neither the dilated terminations of the extreme branches of any of the three vascular systems, nor modifications of the cells of the cellular membrane.

Such are the principal points of variety which I have thought it necessary to lay before you, with regard both to the fluid and solid matter of the tumor, which consists essentially of a new and adventitious structure, and not of the degeneration of structures natural to the body. I have next to notice the changes which the normal structures undergo, in the immediate vicinity of that which is adventitious. Those tumors which consist of well-formed, adventitious, serous cysts of the second class, such as those which have been termed hydatid disease of the testicle or mamma, and in conjunction with which there appears to exist no constitutional taint, produce in their neighbourhood some thickening and condensation of the cellular membrane; but even this is seldom very considerable, and the muscular and other structures appear to undergo no other alteration than that which may be referred to pressure or distension.

Changes produced by these tumors on surrounding parts.

1. Where the disease is not malignant.

2. Where the disease is malignant.

The character of a new product is influenced by the character of surrounding parts.

The case is different with respect to other tumors of this class, in which the essential form of an adventitious serous membrane of the second kind is complicated with the effusion or secretion of a material which, though possessed of certain points of resemblance, appears to differ from any thing that is produced by the natural structures of the body in their healthy state. It seems pretty evident, that, in the disturbed, if not in the healthy process of nutrition, a new product, whatever may be its character, is influenced by the nature of the surrounding parts. As this is an important point, which I wish you not

to take barely on my word, or solely on the authority of cases relating immediately to the subject before us, I will endeavour to illustrate it by one or two independent examples. The first instance which occurs to me, is in the case of masses of bony matter deposited in the condensed cellular structure, resulting from a chronic ulcer situated over bone. In one example, which I have particularly in view, the ulcer occupied the neighbourhood of the trochanter major, and the masses were formed in the immediate vicinity of the bone, but were nevertheless perfectly detached from it. The numerous instances which we see of ossification at the origins or insertions of muscles are probably referrible to the same principle; although it must be admitted, that these examples are not unexceptionable, since in them we have a continuity of structure. I need scarcely remind you of the fact which I have already related to you in one of my former Lectures, that inflammation of a serous membrane, tending to the production of an inorganizable deposit on the smooth surface, is frequently accompanied by a similar production on the attached surface. As a further illustration, it may be noticed, that, after the fracture of a bone, the process by which the new bony matter necessary for union is produced, is often morbidly carried on in the matter which inflammation has deposited in the surrounding structures.

Illustrations
of this doc-
trine.

I shall not take up your time by adducing further illustrations of this principle; but proceed to mention those cases which more immediately belong to the subject before us. They are, in fact, the most striking that can be brought forward; probably from the circumstance, that the heterologue structures are more readily produced accidentally than the analogue.

Although I have directed your attention to this principle, as one of much interest and importance, and well worthy of your investigation, I wish it at the same time to be expressly understood, that I very fully admit the opera-

Application
of this prin-
ciple to ma-
lignant dis-
eases.

Proofs of
the justice
of these ap-
plications.

Circum-
stances
under which
these
changes
occur.

tion of many other causes, which appear to perform at least as important a part in modifying the function of nutrition, and consequently in determining the nature of its product. It is however, as I apprehend, mainly on this principle that we are to explain the fact, that the natural structures in the neighbourhood of malignant tumors are so apt to degenerate into a substance in some respects resembling that of the original tumor. Thus, in the neighbourhood of those tumors which are of slow growth and of cartilaginous hardness, we often find the surrounding structures, but more especially the cellular membrane, partaking of the same character of hardness, though necessarily wanting that structural arrangement which characterizes the tumor itself. In the same way, we find that those tumors in which the arrangement described has been given to a soft and almost brain-like substance are surrounded by natural structures, which degeneration has converted into a nearly similar substance, or which have a similar matter deposited interstitially. Again, in those tumors which are remarkable for their black colour, and to which the name of 'melanosis' has, from this circumstance, been applied, the surrounding structures become more or less deeply tinged with a black or carbonaceous material. This disease also presents us with a good illustration of the principle, but in a mode precisely the converse of the preceding example. There is, perhaps, no organ so liable to be affected with melanosis as the eye; and I cannot help strongly suspecting that it is the natural and healthy production of black pigment performed by the choroid coat of this organ which is the chief cause of this predisposition. It appears that these changes in the natural structures surrounding the tumors of which we are speaking, do not take place until some cause connected with the presence of the tumor has produced in them either absolute inflammation, or a degree of irritation almost amounting to it. It is on the nature of the engorgement or effusion to which this irrita-

tion gives rise, that the nature of the alteration in the natural structures depends.

On reverting to the different causes of variety, which I have now enumerated, as affecting the general arrangement of the structure of the tumor, the character and proportion of its fluid and solid parts—and the appearances exhibited by the adjacent structures, which are often confounded with the tumors itself—you will at once see that there is abundant reason, both for the want of uniformity in these growths—which may, notwithstanding, be referred to one and the same type—and for the very great variety in the opinions entertained by pathologists, respecting their appearances, structure, and nature. There are, however, still other causes, which contribute to the variety and obscurity to which I have alluded. Amongst the most fruitful of these, are the differences in the original structure in which the new growth has taken its origin. Thus, when the new growth is so situated as to be intimately involved in the muscular fibre, the combined effect of their pressure and motion has a strong tendency to obscure its peculiar and essential structure. But, although its form is thus altered, and its structure in some instances is made to approach the character of elastic ligaments, I have never yet failed to detect, in some part or other of the new growth, indications sufficiently conclusive to convince me that, even in these instances, the type which I have explained is still observed.

As the question of malignity or non-malignity is almost constantly agitated with reference to individual tumors, it becomes a matter of considerable importance to define exactly what is meant by this term; and not less so, if it be possible to ascertain with certainty the sign by which a tumor may be known to possess this quality. On this point, however, I do not flatter myself that I shall be able to speak very satisfactorily. There seems, indeed, to be a generally-received and conventional meaning attached to the term 'malignant'; but it is so vague, that I have not been able

Obscurity
created by
these modi-
fying causes.

Additional
causes of
this obscu-
rity.

What is
meant by
the term
'malignant'?

to obtain from books, or from those individuals who are the most conversant with this subject, such a definition as would bear the test of critical examination; and still less have I been able to compose a satisfactory definition for myself. The best substitute that I can offer, in the absence of the desired definition, is an enumeration of those characters, the whole or greater number of which concur in cases to which the appellation of malignant has, by common consent, been applied.

Character-
istics of
malignant
disease.

1. Adjacent
lesion.

The first of these is the alteration which I have already described as taking place in the structures in the immediate neighbourhood of the spot primarily affected.

2. Form of
ulcer.

The second is the peculiar figure and appearance of the ulcer to which the malignant tumor ultimately gives rise. This ulcer, as well as the mechanism of its production, I have already particularly described.

3. Glandu-
lar enlarge-
ments.

Thirdly: As a consequence either of the external ulceration, or internal death and softening of the tumor, the absorbent glands, situated in the course of the lymphatics leading from the part, become enlarged, by a deposit having very much the character possessed by the original tumor.

4. Occur-
rence of si-
milar lesion
in other
parts.

Fourthly: Besides the affection of the glands situated in the course of the circulation, and, at times, without this having sensibly taken place, other parts of the body become the seats of similar deposits. Occasionally, deposits of this kind take place simultaneously in very many structures and parts of the body. At other times, they are confined to very few organs, or even to a single organ; in which case, the selection of the organ or organs, in which such deposit occurs, appears to be very much influenced by the seat of the primary affection. Some of the instances of this kind afford curious proofs of the inexplicable sympathy existing between remote organs. Thus, in a case of fungoid disease affecting an absorbent gland in the neighbourhood of the parotid, glands of a similar description, situated near the upper edge of the pancreas, were found enlarged, and par-

ticipating in the disease. Scirrhus tubercles in the uterus are in the same way found in conjunction with scirrhus mamma. Of all organs, the liver is perhaps the most liable to become the seat of these secondary depositions of malignant tumors or tubercles. We find them in this situation when the primary formation has taken place in the eye, the breast, the stomach, the rectum, the mesentery, the kidney, the testicle, or, perhaps, in many other situations.

Fifthly, whilst these affections have taken place in different parts of the body, and in some instances even whilst the structural derangement continues limited to the immediate neighbourhood of the spot first affected, the system generally becomes more or less seriously deranged. The complexion loses its natural and healthy clearness, and presents a diffused sallow or leaden hue, or, in some instances, a dingy redness. The countenance is expressive of sadness or anxiety; and is so peculiar, as, in most cases, to be easily recognised by the practised eye, though it is difficult to convey a description of it in words. The patient, worn by a lingering hectic, which is generally accompanied by distressing watchfulness, usually, though not invariably, becomes extremely emaciated. To the production of this effect, loss of appetite, distressing nausea, and occasional vomiting, together with colliquative sweats, the ill-conditioned discharge, occasional hæmorrhage from the sore, and local and general pain, mainly contribute.

5. Constitutional affection.

These are the principal characteristic features of malignant disease; but it is sufficiently notorious that many of them are often absent, notwithstanding the existence of a tumor, or even of an ulcer, respecting the malignant nature of which few competent judges would hesitate to pronounce. Again: some of these characters belong to affections which are not regarded as malignant, as well as to those which are so regarded. Thus, 1. The alteration of the surrounding structures may accompany other tumors besides those which are considered as malignant; and the peculiar nature

Inadequacy of the description now given.

The adjacent lesion is not peculiar to malignant disease;

nor is the
ulcer always
character-
istic ;

nor is the
glandular
enlarge-
ment dia-
gnostic :

nor, usually,
is the affec-
tion of other
organs to be
ascertained
during life ;

of the change which they undergo, when the tumor is malignant, cannot be positively ascertained by the mere application of the fingers to the tumor whilst covered by the integument ; nor can it be always ascertained when the parts are actually removed from the body. 2. The characteristic appearance of the ulcer is not at all times present ; for the production of the new and external parts of the tumor, on which the elevation of the edge depends, is not constantly going forward ; and, during its suspension, the surrounding more or less healthy integument will sometimes put on an appearance which affords a temporary and fallacious promise of cicatrization. Again : ulcers possessing no degree of malignity sometimes present, in consequence of the size and arrangement of their granulations, an imperfect resemblance to the malignant ulcer. 3. The consecutive effect observable in the absorbent glands is far from being peculiar to malignant disease, but attends them in common with scrofulous, venereal, and common inflammations. The nature of the changes which these glands undergo may indeed be peculiar in malignant diseases ; but of these changes we can know but little, at the time when the knowledge of them would be of the greatest importance. With respect to the 4th character which I have mentioned, or that of similar productions taking place in other organs than that primarily affected, it is one which, though it may often be suspected, can frequently not be ascertained until after death. Moreover, the same tendency not unfrequently accompanies the production of scrofulous tubercles, which we find invading various organs in the same subject. And again, it does sometimes happen, that cases of malignant disease, most strongly marked both with respect to the local affection and to the characteristic derangement of the general system which accompanies it, and which ultimately brings the patient to his grave, may present no trace of the peculiar structure, except in the part first affected, and in its immediate neighbourhood ; even the absorbent glands

belonging to it may escape. A striking instance of this kind occurred in a patient of my friend J. Morgan. A man came into the hospital affected with fungoid disease of the testicle. The testicle was removed. The disease re-appeared in the cut extremity of the cord; and a second operation was performed, which, like the first, was followed by the renewed growth of the morbid structure. No further operation could be performed. A large, bleeding, fungoid ulcer occupied the greater part of the groin, and the patient died with all the constitutional symptoms which belong to the last stages of this formidable complaint. On examining the body after death, I found that the new growth, which presented the ulcerated surface which I have mentioned, afforded a very complete specimen of the medullary or brain-like matter. I was much surprised, in pursuing the examination, not to discover any trace of the disease in the absorbent glands, or in any other part of the body. 5. Those general and constitutional symptoms which I enumerated in the fifth place are, like the others which I have mentioned, by no means infallible. Sometimes the patient, though affected with a tumor, respecting the malignant nature of which there can be no doubt, for a long time bears up against its fatal influence: and sometimes patients, whose health is seriously impaired by chronic visceral derangements, present, in the complexion and expression of their countenances, appearances which induce strong suspicions of malignant disease.

nor are the constitutional symptoms always present;

nor, when present, diagnostic.

Besides the indications of malignity of which I have been speaking, others, which may perhaps be regarded as of still less value, have been pointed out. Amongst these may be mentioned the obstinacy with which the ulcer resists all the efforts which are made to promote its healing; but this is a character by no means peculiar to malignant ulcers. Another character is, the enlargement of the veins in the neighbourhood of the affected part: this symptom, however, is not at all times present as an accompaniment

Other symptoms of malignant disease, and estimate of their value.

to malignant formation, and may be present where malignity does not exist. More stress has been laid on the peculiar darting or lancinating pain which is felt in and about the diseased part; but this feature, though strongly characteristic of some forms of malignant tumors, does not accompany all of them, and pains presenting very nearly the same character at times accompany affections of a different nature.

You will readily judge, from the sketch which I have just given, how difficult it must be, not merely to compose a concise verbal definition of the term 'malignant,' as applied to the tumors in question, but also, in many cases, to draw the line in actual practice. For my own part, I should, in examining a tumor in the living subject, be in general disposed to suspect what has been called malignity, whenever I could detect indications of the structure which I have described, accompanied with alteration of the surrounding structures, referrible in their origin to some external violence, or to a pre-existing indolent tumor. These suspicions would be proportionably stronger, if the tumor in question occurred in a part known to be rarely, if ever, affected with that non-malignant and well-defined form of tumor commonly termed 'hydatid,' which, in common with those of a malignant character, distinctly possesses the structure alluded to. My suspicions would be progressively converted into absolute certainty, in proportion as the other symptoms previously detailed were united to those which I have assumed, as presenting themselves in the suspected tumor. But how are we to determine, when the tumor has been removed from the body, and a question as to its malignity has been started? In the first place, I should consider some traces, however slight, of the structure which I have described, existing in some part of the morbid growth, as a *sine-qua-non* to the character of malignity. Hence arises the importance of having the whole, or a very considerable part of the tumor, submitted to our examination:

Summary of
the sym-
ptoms on
which dia-
gnosis may
be most
safely
founded :

1. in the
living ;

2. in the
dead.

and, if possible, that part which constituted the original formation should be contained in the portion selected for examination. This point being ascertained, we may, I believe, pronounce on the malignity of the new formation with a confidence proportioned to the degree in which the new growth deviates from the natural structures of the body, but more especially from the serous membranes. The spontaneous death of an internal part of the tumor, in consequence of the strangulation of some of the pedunculated bodies which compose it, is not alone a proof of malignity; but I have little doubt that the influence which this change exerts strongly contributes to induce a malignant character. The degree of integrity or degeneration of the surrounding natural structures will also aid materially in deciding the question. When we have the opportunity of examining not only the tumor but the entire body, the presence of similar tumors in other parts of the system may warrant us in giving an unqualified affirmative, but their absence by no means proves the negative.

I must now say a few words respecting the constitutional taint, or specific diathesis, which is by many supposed to accompany the production of malignant formations. It is manifest, that the common exciting causes, to which the origin and formation of malignant tumors are wont to be ascribed, are continually operating on hundreds of individuals on whom no serious effects are produced.¹ Hence it has been supposed, that a certain pre-existing condition of the system is an essential element to the production of the disease, although these same individuals may have enjoyed perfect health up to the time at which the exciting cause was applied. On the other hand, facts, at least equally strong, tend to favour the idea, that it is from the local affection that the constitutional taint is derived; since, in proportion to the indolence or activity of the primary affection, may in general be observed the rapidity and extent of the invasion of other parts of the system. The affection of the

On the malignant diathesis.

glands, in the course of the absorbents leading from the diseased part, might also be adduced as an argument in favour of the contamination of the system through the agency of absorption: but, on the other hand, we have unequivocal proof of this effect having taken place when the part primarily affected has been completely removed before the absorbent glands had been affected. I shall not pursue the interesting investigation of the *modus operandi* of morbid poisons, to which these observations are calculated to lead; but refer you to the work of my valued friends, Dr. Addison and John Morgan, in which you will find the operations of poison in general ably considered and elucidated.

Liability of
certain
structures
to malignant
disease.

There is an interesting inquiry, to which I have already alluded incidentally, but which deserves further notice. It is very obvious that some parts of the body are much more liable to become the seat of these structures than others. This suggests a query of some interest, respecting the cause of the marked predisposition to the production of this derangement in these structures. I have already observed, that some local accidental lesion can often be referred to as the exciting cause to which the commencement of the developement may be referred. In the case of ovarian tumors, I pointed out the circumstances which, I conceive, expose these organs, notwithstanding their well-protected position in the body, to frequent partial lesion of their texture; and I noticed the intermitting and periodical variations to which the functional activity of these organs is liable, as probably contributing to favour the production of adventitious growths, in consequence of local lesion. Let us now inquire whether there are any peculiarities in other parts which may tend to give them a liability similar to that which we find in the ovary. The female breast will, of course, from its extraordinary liability, be the first to suggest itself as a subject of this inquiry. Like the ovaries, the mammary glands manifestly participate in the periodical changes which take place in the female system: hence

Liability of
the female
mammary.

the increased fulness and exquisite sensibility, sometimes amounting to actual pain, occurring in and about these organs, at or near the period of menstruation. We have, therefore, evidence of a very material variation in functional activity, independently of that more remarkable change which takes place in the glands after parturition, is attended with the production of a copious and new secretion, and often subjects them, not merely to painful, but mutilating attacks of inflammation. In conjunction with these two causes favourable to the predisposition to disease, it will be necessary to take into account the liability to the occasional exciting causes to which the mammæ, from their prominence as well as their position in the body, are unavoidably subjected. Against these dangers, the mobility of the glands, and the abundance of subcutaneous fat by which they are surrounded, afford some protection: slight violence, therefore, is often received with impunity, so long as the constitutional disposition to the production of scirrhus, and the diseases allied to it, is wanting: but no sooner is this constitutional tendency set up, by some circumstance which interferes with the general health, than the causes which I have explained are at once brought into action for its development.

It not unfrequently happens, in persons in whom the disposition to the production of malignant disease unfortunately exists, that tumors of this kind spring up in various parts of the body, immediately beneath the integuments. These, I conceive, may be ascribed to the occasional exciting cause of very slight blows; which, with other individuals not so predisposed, would scarcely give rise to a visible bruise. The positive effect of such very slight injuries is more evident, though differently exhibited, in the case of another disease of a constitutional character; — I mean scorbutus or purpura, when the slightest blow or pressure will often occasion a visible ecchymosis.

Occurrence
of sub-
cutaneous
malignant
tumors.

Some parts appear to be predisposed to become the seat

Low degree
of vitality
productive
of adventi-
tious
growths.

of malignant adventitious structures, in consequence of their being possessed of a lower or inferior degree of vitality. I employ this term, for want of a better, to designate a condition, which I think you will understand, when I have stated some examples of the class to which I have alluded. I employ the term 'vitality' here, as well as on a former occasion, without any connection with the mystification which sometimes attends its use. There are organs natural to the body which do not constantly maintain the same proportion of nutrition and function with reference to other parts of the body, and are consequently subjected to wasting or atrophy. The thymus gland, the supra-renal capsules, and even the mammary glands themselves, both in the male and female, are examples of this kind; which will both illustrate what I mean by a lower or reduced mode of vitality, and exemplify the predisposition to malignant disease thence arising. *Nævi materni* afford another example of structures whose mode of vitality is in some degree imperfect. Without inquiring into the causes which give rise to their formation, it is evident, that, though they exist as living appendages, they have no necessary function to perform; and, though often highly vascular, are possessed of a very low degree of that power which enables the different parts of our bodies to resist foreign agents, and retain their own integrity. *Nævi*, either on the one hand perish under, or imperfectly repair the effect of injury; or on the other, are the subject of inordinate and unrepressed developement, when an increased determination of blood takes place towards the region of the body in which they are situated. *Nævi*, in conjunction with the condition of vitality which I have described, possess a remarkable proneness to become the seat of malignant disease, and more especially of fungus hæmatodes. I have seen several instances in the wards of this hospital; and a very striking case occurred when I was attending the practice of Boyer, at the Hôpital de la Charité, in Paris. A man, rather advanced in years, presented a

Liability of
nævus to
become the
seat of ma-
lignant
disease.

large carcinomatous ulcer on his breast; which, he informed me, had originated in a nævus, upon which he had received a blow from the nose of a horse.

I am inclined to believe that the imperfection of the parts I have pointed out, as possessing a marked liability to the invasion of the adventitious structures under our consideration, is more dependent on their innervation than their vascularity. We may observe, that they present almost every variety in this latter respect, without there being any very marked corresponding difference in their degree of predisposition; but they appear to agree in this, that they are less than other parts under the influence of that power, the effect of which is as manifest as its nature is obscure, by which the healthy, natural structures retain their form and volume within definite limits. This power, which gives its peculiar form to our various members, and which allows of their regular and progressive developement and increase as we advance from infancy to adult age, and then suspends and arrests the process—this power or influence is sensibly impaired in those structures which, like the thymus gland and capsulæ renales, waste to a variable amount in those periods of our existence in which their functions are not exercised. The absence of the power is still more manifest in nævi, whose accidental existence does not appear to be destined for the performance of any function, and which grow, apparently, without any fixed limits as to size or figure. The adventitious structures which we see taking their origin from these parts, appear still further removed from this regulating influence; and, as to form and structure, agree only in presenting those characters which result from the cystiform structure dependent on the formation of compound serous cysts, which is probably to be referred to some general physical principles.

There is one of the animal tissues not yet enumerated, which presents a remarkable liability to malignant disease: I mean fibrous tissue, whether occurring in fascia or tendon,

Liability to malignant growths connected with degree of innervation.

Fibrous tissue very liable to malignant disease.

or, somewhat modified, in the form of periosteum or dura mater. Parts composed of this tissue, although they have their vital functions feebly developed, are, nevertheless, sufficiently uniform and fixed as to their form, extent, and structural arrangement. The new growths to which they occasionally give origin are, at first, lodged in the neighbouring cellular membrane; and it is a mere conjecture, on which I lay little or no stress, that the production of these growths may depend on some peculiarity in the mode in which the cellular membrane and fibrous tissue are connected. The liability of parts of which I am next to speak is of much more practical interest and importance. I allude to tumors not originally possessing, or supposed to possess, a malignant character, but ultimately acquiring it. Where the tumor in question already possesses the character of compound serous cysts, as in the form of ovarian dropsy, with the description of which I commenced, and in those affections of the breast and testicles which are described as hydatid, the change from non-malignity to malignity is neither great nor obscure. Even in these cases, it would appear that the change does not take place in the parts once formed; but the new parts, which are successively added to the tumor, progressively deviate from their resemblance to the serous membranes. I cannot adduce any better example of this, than the cases of ovarian tumor; in which the patient, having long laboured under incysted dropsy, ultimately sinks, and fungoid growths are found forming a part of the diseased mass. The same kind of progressive change may be seen in solid tumors in different parts of the body. This may be observed where a succession of tumors has been removed from the same parts, and where parts of the same tumor have been removed at different periods. The portions first removed may present a very doubtful aspect, whilst those taken at a later period leave no room for hesitation. With respect to tumors which, at their commencement, possess nothing of the structural

Liability of
simple tu-
mors to be-
come ma-
lignant.

characters which we have been considering, the mode in which they acquire malignity is somewhat different. Nevertheless, they agree in this, that the change is not effected by the transformation of the parts of the tumor originally formed; but they may be associated with those parts which are possessed of an impaired or low degree of vitality, such as wasted organs and *nævi*, and are consequently liable, from any external injury, or cause of increased disturbance inherent in the system, to give rise to the adventitious structures in question. Although some local lesion may almost invariably be referred to as the exciting cause for the formation of the first tumor, and although similar lesions may determine the production of others when the system has been brought under the influence of malignant disease, yet the existence of such exciting cause is by no means necessary in this latter case. These secondary tumors are often produced in a manner of which we can give no other explanation, than an unsatisfactory reference to that mysterious sympathy which connects particular organs, both pathologically and physiologically.

There is another mode of extension of the disease, in which neither the sympathies in question nor direct vascular communication are concerned. I refer to the contamination of parts which are merely in contact, opposition, or approximation to each other. As instances of the contamination of juxtaposed parts, I may mention those cases in which an ovary, the mesentery, or the liver, being the seat of a malignant tumor, the parts in contact with it, whether convolutions of intestine or abdominal parietes, become similarly affected. In such cases, it might be questioned, whether some principle, capable of deranging the nutrition of the part which becomes secondarily affected, does not pass by transudation. The concurrent inflammation of contiguous portions of a serous membrane affords an analogy favourable to this idea.

Influence of
proximity.

Adventitious productions of a malignant character are

sometimes formed along the course of the blood-vessels, in so marked a manner, as to render it more than probable that they are in some way connected with the extension of the affection. I have already noticed two rows of fungoid tumors following the course of the intercostal vessels, in the case of Martha Doherty (see p. 173). I have also repeatedly seen tubercles of the same character arranged in the course of the arteries of the mesentery, omentum, and other parts within the abdomen.

LECTURE X.

ON MALIGNANT DISEASE.

SCIRRHOUS AND FUNGOID TUMORS.

DISTINCTION BETWEEN CLASSES OF MALIGNANT GROWTHS.—ON THE CHARACTERS, STRUCTURE, AND SIZE OF SCIRRHOUS TUMORS.—LESION OF PARTS ADJACENT TO SCIRRHOUS TUMORS—ULCERATION OF SCIRRHOUS TUMORS—SCIRRHUS DOES NOT DEGENERATE INTO FUNGOID DISEASE.—SPONTANEOUS AND ARTIFICIAL CURES OF SCIRRHUS—ON THE UTERINE TUMORS TERMED SCIRRHOUS—NOMENCLATURE OF FUNGOID DISEASE—POINTS OF CONTRAST BETWEEN SCIRRHOUS AND FUNGOID DISEASE—VASCULARITY OF FUNGOID DISEASE—SOLID PORTIONS OF THIS FORMATION—EVIDENCES OF CYSTIFORM STRUCTURE IN FUNGOID TUMORS.—PHENOMENA OF OSTEOSARCOMA—AFFECTATION OF SURROUNDING STRUCTURES IN FUNGOID DISEASE—ON GELATINOUS OR GUM CANCER—ASSIMILATION OF SCIRRHUS TO FUNGOID DISEASE—DIAGNOSTIC MARKS COMMONLY RELIED UPON.

GENTLEMEN,

HAVING, in my last Lecture, completed the general remarks which I thought it necessary to offer respecting the mode of formation, anatomical structure, composition, and habits common to the greater number of the heterologue, adventitious deposits that are met with in the human body, I now proceed to speak of the different species of these structures, but especially of those to which the term 'malignant' has been applied. Formerly, as I have already stated, in a remark borrowed from Laennec, all the forms and varieties of these productions were vaguely comprehended under the term 'cancer,' or 'carcinoma.' Although, as I have endeavoured to shew, these formations, by their structure, mode of developement, and, for the most part, by their influence on the system, are with propriety to be referred to one common type, and grouped into one family, yet, as we shall presently see, there are certain peculiarities, which will justify us in forming at least three specific divisions. Their limits, it is true, are so ill defined, and they pass so gradually

Distinct
classes of
malignant
growths.

into each other, that it is often difficult to decide to which of the species a particular specimen should be referred. In the best-marked cases, however, there is no difficulty of this kind.

First observers of these distinct classes,

The distinctions of which I am speaking were, I believe, first pointed out and insisted on by Laennec and Bayle, in France. It happened very nearly at the same time, and without any intercourse between the two countries, that Burns, Hey, and Abernethy, were engaged in the investigation of the same subject in this country. Their labours have been followed up, amongst our countrymen, by Wardrop, Langstaff, Cullen, and Carswell; and, in France, by Cayol, Breschet, Cruveilhier, and Ferrus.

On scirrhus.

I commence by speaking of that form of tumor to which the name of 'scirrhus,' or 'true scirrhus,' has been more particularly applied. As the term implies, tumors of this denomination are characterized by their hardness, which, in many instances, is at least equal to that of cartilage; but they want the uniform texture of this natural tissue, and, in this respect, bear a nearer resemblance to fibro-cartilages. Hence, when divided by incision, they give rise to some noise, and are said "to cry under the scalpel." It is not only in density of structure, but also in colour, that the scirrhus tumor exhibits a want of uniformity. These variations may be satisfactorily referred to the mode of formation which I have pointed out. The hardness of these tumors appears to be intimately connected with the slowness of their growth; and the comparative indistinctness of the structure, to which I have alluded, is another effect proceeding from the same cause.

Structure of scirrhus tumors.

True scirrhus tumors appear sometimes to depend on a single primary tumor: at other times, several may be satisfactorily made out. That part of the tumor which appears to have been the common origin of the primary cysts, where there are more than one, or from which the contained pedunculated bodies radiate, when there is only a single

primary tumor, is, in general, the most indurated portion, and is, at the same time, the most indistinct in its structure. When examined externally, after the surrounding natural structures have been carefully dissected off, this part of the tumor is found to be the most irregular, has a somewhat corrugated appearance, and suggests the idea of its having been a sort of root by which the adventitious growth was implanted on the natural structures. The radiated appearance so strongly insisted on by most authors who have described scirrhus tumors, and with the rationale of which I have made you acquainted, is particularly conspicuous when the section passes through this point. The fluid part of a true scirrhus tumor bears, in general, a very small proportion to the rest of the structure: it has a viscid or mucous character where softening has not taken place; but, where this process is going on, it assumes the character of an offensive, ichorous discharge, and acrid and highly deleterious qualities have, by some, been ascribed to it. The process of softening sometimes commences internally at one point; at other times, in several small isolated points; in others again, the ulceration through the integuments is the first part of the process of decay.

True scirrhus tumors, notwithstanding the length of time during which they continue to grow, very rarely acquire a considerable size; and, indeed, it not unfrequently happens that the wasting of the neighbouring structures, and more especially of the female mamma, which is by far the most frequent seat of true scirrhus, more than compensates for any increase of volume dependent on the new formation. Sir Charles Bell has particularly pointed out this source of fallacy, which has induced some persons to assert that scirrhus was not always productive of tumor.

True scirrhus appears to be a form of malignant disease essentially peculiar to the more-advanced periods of life. It would seem, indeed, that the more resisting nature of the different tissues, and the more tardy and feeble operation

Size of
scirrhus
tumors.

Scirrhus is
a disease of
advanced
life.

of the function of nutrition which characterize the decline of life, are the principle causes which render scirrhus a malignant disease of old age.

Lesion of
parts sur-
rounding
scirrhus
tumors.

The chronic characters which belong to scirrhus are not confined to the essential part of the tumor itself: the surrounding structures participate in it. By repeated attacks of inflammation arising from the presence of the tumor, the neighbouring cellular structure becomes thickened and indurated. It is on the implication of the nervous fibrillæ of the part in this altered structure that, as I apprehend, principally depends the peculiar and characteristic lancinating pain which accompanies the accessions of inflammation to which an organ affected with scirrhus is continually liable. This indurated cellular membrane has often been observed extending from the external part of the tumor, amongst the adipose structure in which the mammary gland is situated. Like inflamed and thickened cellular membrane resulting from other causes, this structure becomes gradually contracted, and most materially contributes to the puckering and distortion of the affected part. In the mammary gland, in which this puckering has been chiefly noticed, the traction exercised by the lactiferous tubes is the cause generally assigned. I do not deny that they may have some share in producing this effect, both by their own obliteration and contraction, and also as the medium by which the gland, altered and displaced by the tumor, acts upon the nipple; but I feel pretty confident that the cause which I first assigned is the principal one. These same prolongations of indurated cellular membrane, proceeding from the tumor into the surrounding adipose substance, appear to have been considered as prolongations of the radiating lines observable within the essential part of the tumor, and to have been regarded as a part of the scirrhus structure itself; in fact, as fibres of the disease on which its re-appearance after an operation mainly depends. For my own part, I very much doubt whether this altered cellular

Induration
and con-
traction of
cellular
membrane.

Supposed
fibres, roots,
or claws of
the cancer.

membrane itself really possesses any thing of the malignant nature; although I can easily conceive that the new tumor, by which the disease makes its re-appearance, may have taken its origin in the course of one of these indurated prolongations left in the surrounding structures. I believe this circumstance is to be explained in the following manner. In dissecting away the fat from the principal part of a scirrhus tumor, I have had occasion to notice these prolongations of cellular membrane; and, in doing so, I have observed very small and delicate pedunculated cysts, some of which scarcely exceeded the size of a pin's head, dispersed upon these prolongations. It is to the development of one or more such cysts, rather than to the altered cellular membrane itself, that the new tumor is to be attributed.

True scirrhus tumors, in many instances, remain for a length of time in an indolent state, without passing into a state of softening, or producing an external ulceration. Before this ulceration takes place, the tumor becomes adherent to the skin; and though there is generally but little redness observable in these tumors, a spot, most frequently of small extent, becomes of a bright and cherry red, or of a purple livid colour, before the continuity of the integument is destroyed. It is needless that I should again describe the characters of a malignant ulcer which are, in general, very completely seen in the ulcerative stage of true scirrhus. It may however be said, that the ulceration of true scirrhus is accompanied by a more decided loss of substance than that of the next form of tumor of which I shall have to speak, viz. cerebriform cancer, which is often attended with large, rapid, and irregular growths from the ulcerated surface; whence the names of fungoid disease, fungus medullaris, &c., have, in all probability, been derived. The ulceration of true scirrhus is, indeed, bounded by its elevated wall of circumvallation; but the central parts, gradually hollowed away by the softening of the very imper-

Ulceration
of scirrhus
tumors.

fectly organized structure, presents a foul and deep chasm. It is to this state of the ulcerative stage of true scirrhus that the appellation of cancer, or carcinoma, in the most restricted sense, has been applied.

A scirrhus tumor does not generate into a fungoid.

Some pathologists have considered, that both cancer and fungus result from the degeneration of scirrhus; that, if acute inflammation attack the scirrhus structure, ulceration follows, presenting all the characters of cancer; but that, if the structure undergoes a gradual degeneration, and breaks down, a cerebriform mass is the result. I must avow my dissent from this doctrine, although promulgated by the learned authors of the *Dictionnaire de Medicine*, in an article which I believe to have come from the pen of Breschet. I see no reason to doubt that these two species of diseased structure depend on differences which exist *ab initio*; and I cannot help being more particularly surprised that cancer should have been considered as a more acute form than the fungoid disease.

Hæmorrhage takes place from a carcinomatous ulcer.

In a cancerous or carcinomatous ulcer, it not unfrequently happens, that one or more vessels give way, and lead to a hæmorrhage, which, in some instances, is very profuse. Such hæmorrhages are, however, very different from those which form so characteristic a feature of fungus hæmatodes. In cancer, the greater part of the ulcerated surface, though irregular, is possessed of considerable, nay, almost cartilaginous firmness: the hæmorrhage in question takes place from particular points; and, if we attempt to inject such an ulcer with fine injection, either after its removal from the body or after the death of the subject, we obtain but very imperfect success, because the larger portion of the injection escapes from the open arteries. Such hæmorrhages are so far from being attended with an exuberant, sprouting, fungous growth, that, at times, they seem to be the principal means of procuring a temporary improvement in the appearance of the ulcer.

I believe that it has sometimes, though indeed very

rarely, happened, that tumors possessing the characters of true scirrhus, and regarded as such, have become detached by the sloughing of the surrounding structure; and, being in this way completely thrown off from the system, the cavity which they occupied has been filled up by granulation, the surface has cicatrized, and a permanent cure has been obtained. The occasionally successful practice of some empirics consists, I believe, in attempting to induce this process artificially. Arsenic appears to be the principal agent to which they have recourse for this purpose. I am far from wishing to advocate this mode of treatment; which, whilst it offers very little advantage that cannot be more readily obtained by extirpation with the knife, is liable to serious objections to which the use of the scalpel is not exposed. It can only be in the early periods of the affection, when the surrounding structures do not participate in the disease, and when the constitution is yet untainted, that there is any chance of success, from this or any other means. I may state, however, that some years since a tumor formed in the breast of a lady of my acquaintance, who was about the age the most liable to cancer. From the account given to me respecting the character of this tumor, it bore the strongest resemblance to true scirrhus. Being unwilling to submit to the knife, this lady placed herself under the care of a female quack, who professed to cure cancers in the way which I have described. Under the use of the secret means which this person employed, the tumor, which consisted of two primary portions, was completely detached entire. The wound was closed, leaving a very trifling cicatrix; and the lady has had no return of the affection. During a part of the time that I spent in Rome, I lodged with a Dr. Viale, who was surgeon to the Inquisition. He was an elderly man, of considerable experience. He assured me that he had long been in the habit of adopting a plan of treatment such as I have described, both in malignant and other tumors, with very considerable success.

Spontaneous cure of scirrhus—a thing possible, not probable.

Methods of extirpating scirrhous tumors.

I have already, perhaps, too far wandered from the vince of the morbid anatomist, into that of the surgeon, and shall not attempt to enter into the detail of the symptoms which attend the progress of scirrhus and cancer.

Organs invaded by scirrhus.

Although the mamma, the uterus, and the lips are parts the most frequently attacked, few if any organs can be said to be wholly exempt from scirrhus. It is not, however, so prone to invade numerous organs in the same individual as the fungoid disease of which I shall have next to speak.

Uterine tumors termed scirrhus.

Before quitting, for the present, the subject of scirrhus and cancer, there is one form of tumor, to which the term of scirrhus is applied, which differs so considerably from some of those which I have been describing, that I must not pass it over unnoticed. I allude to the scirrhus tubercles developed in the body of the uterus. They possess a well-defined, rounded figure, and a close, compact tissue, in which the structure, referrible to the same type as the cysts to which I have so often alluded, is tolerably distinct, on a much larger scale than that generally observable in true scirrhus tumors in other parts of the body. They rarely, if ever, present any cells or cavities. They acquire a much larger size than true scirrhus tumors in other parts of the system. They never, or at most very seldom, pass into the stage of softening or ulceration; and, when formed in the uterus without any other organ having exhibited a tendency to the production of scirrhus, the formation almost always continues to be wholly confined to this organ; consequently they do not appear to be accompanied by any constitutional taint. On the other hand, their occasional formation in conjunction with the primary scirrhus and cancerous affection of the mamma and other parts necessarily connects them with the malignant disease of which I have been speaking. Although these tumors or tubercles are little liable to the process of softening, their formation disposes them, in common with other growths of the same family, to a dimi-

nution, or loss of their vitality. It would seem, however, that this takes place very gradually, and is accompanied by deposition of bony or earthy matter: so that, by the time the nutrient vessels are nearly or quite obliterated, the scirrhus is converted into a bony structure, little susceptible of change, and which may consequently be retained to an almost indefinite period in the system, without material injury to the organ in whose substance it is imbedded.

The peculiarities which I have just described as belonging to the scirrhus tubercles of the uterus, are, doubtless, in a great measure referrible to the part in which they are developed. In the first place, the uterus, as I have before remarked, is naturally disposed to accommodate itself to a stimulus which excites to an increased supply of nourishment. It is no less remarkably calculated to yield passively to the distension of bodies progressively increasing within it; and, moreover, its structure is but little susceptible of morbid actions. Hence the new or adventitious growths have an abundant supply of the nutrient fluid. Their enlargement meets with no violent or partial obstruction; but, at the same time, is subjected to a steady, moderate, and uniform pressure, which in all cases tends materially to diminish the relative proportion of the fluid parts, and to which, in the instance before us, we may attribute the absence of cells, and the firm and compact structure of the tumors. Since the fibres of the uterus rarely contract, except during parturition, we need not be surprised to find that the scirrhus tumors developed amongst them are very far from being modified similarly to those which I have mentioned as being formed amongst the ordinary muscular fibres; as, for instance, in the deltoid or masseter. To the little susceptibility which the uterus exhibits with respect to morbid actions, we may most probably attribute both its own immunity from the scirrhus affection, and the absence of constitutional taint.

Causes of
peculiarities
of these
tumors.

The affection of which I have next to speak, not-

Fungoid
disease—
known by
various
names.

withstanding that it must have been long familiar to the eyes of practised pathologists, has only recently been regarded and described as a particular disease. It has, however, already received several names; which, by some, are used almost indifferently, or as synonymous; whilst by others they are considered as denoting different varieties, if not species, of malignant disease. Thus we find the terms 'encephaloid tumors,' 'cerebriform cancer,' 'medullary sarcoma,' 'spungoid inflammation,' 'fungus hæmatodes,' and 'fungoid disease.' I am rather inclined to prefer the last of these terms, namely, fungoid disease, not merely in imitation of my distinguished teacher, Sir Astley Cooper, but because, whilst it indicates that exuberant growth which almost invariably characterizes this class of tumors, it leaves undefined the particular character of the structures composing them, and consequently does not exclude any of the varieties comprehended in the division of which I am now to speak.

Points of
contrast be-
tween
scirrhus and
fungoid
disease.

One of the most striking features which distinguish the fungoid disease from true scirrhus is to be found in the extent and rapidity of the developement of fungoid tumors. Whilst, as we have seen, true scirrhus often remains for a considerable length of time in a chronic and indolent state, and, after a growth of some years, produces a tumor of only a moderate size, the fungoid tumor in the space of a few weeks is sometimes seen to attain to a prodigious size, and to pass through all the stages which belong to it in common with the other members of the same family of adventitious structures. Whilst true scirrhus is almost exclusively the disease of advanced life, the fungoid disease makes its appearance in individuals of every age, but its most formidable and extensive ravages are seen in the young. Whilst in true scirrhus the fluid matter forms a very inconsiderable and scarcely notable part of the structure, in the fungoid tumor it is frequently abundant, presents a great variety in its characters, and is often collected in cavities of

considerable size. In the scirrhus tumor, the peculiar mode of formation which I have pointed out must often be traced by analogy, guided by faint and partial indications; but in the fungoid disease we meet with those unequivocal manifestations which almost speak for themselves. In true scirrhus, the traces of vascularity are very faint; but in the fungoid disease, the adventitious membranes possess a high and preternatural degree of vascularity, and the vessels, which we see ramifying in them, are not only numerous, but large. By some, they have been considered to be principally arterial; by others, venous. I will not attempt to decide to which class of vessels they are most nearly allied, but they appear to consist of the capillary vessels of Bichat on a large scale; and, as we sometimes meet with these membranes of a bright and arterial red, and at other times of a venous or livid hue, it seems probable that accidental or fortuitous circumstances have the principal share in determining to which class of vessels these capillaries should most incline. These newly-formed vessels, though large and numerous, are extremely weak and tender, and derive little or no support from the structure through which they ramify or by which they are surrounded: they are therefore liable to give way at numerous points; and hence proceed those frequent and extensive hæmorrhages which so often characterize these tumors, and have led to the term of fungus hæmatodes, a name not inaptly applied to many of them. Sometimes the hæmorrhage from these vessels produces an effusion into the cavity of the membrane reflected over an inferior order of pedunculated cysts or bodies; and distends it into a bag filled with blood, the characters of which will vary according to the time which has elapsed between its effusion and the making of the examination. At other times, the effused blood infiltrates the more solid parts of the tumor, and produces an appearance which, by Laennec, has been well compared to an apoplectic clot.

Vascularity
of fungoid
disease.

Extrava-
sations of
blood in
fungoid
tumors.

The more solid parts of the tumor differ, in a marked

Solid parts
of fungoid
tumors.

manner, from those which compose the scirrhus tumor. In this disease, the secondary cysts, which are often of large size, generally become filled with a material which at first bears a considerable resemblance to tender or feebly coagulated fibrine or plastic lymph. New vessels speedily shoot into this substance; which, being neither susceptible of perfect organization, nor calculated to remain inert and dormant, rapidly but gradually loses its vitality, and, like other transparent parts in which such a change is effected, becomes by degrees opaque, and bears, in consistence and appearance, a close resemblance to the substance of the brain of a child. Hence the terms 'cerebriform cancer,' 'encephaloid tumor,' and 'medullary sarcoma.' The idea of this resemblance has been carried so far by Professor Maunoir of Geneva, that he has even considered that an adventitious production and deposit of cerebral matter actually takes place in this disease, and constitutes the bulk of the tumor: such an idea I consider perfectly inadmissible. I am not aware that even a single nervous fibrile has ever been discovered in the essential part of the fungoid growth. Although in fungoid disease the solid part of the tumor often bears a striking resemblance to cerebral substance, we frequently find it, on the one hand, deviating into a much more firm material, and, on the other, into one of a softer and grumous consistence. Sometimes it has a minutely foliated structure, of a pearly white colour. When the diseased structure has completely lost its vitality, it breaks down into a variously-discoloured, pul-taceous, grumous mass, in which the remains of the membranes of the secondary cysts and their vessels may often be detected.

Evidences
of a cysti-
form struc-
ture in
fungoid
tumors.

Although in a recently-formed tumor, or in the newer parts of an older one, the traces of that mode of formation, on which I have insisted, are sufficiently evident, they are very much lost or obscured as the process of decay advances. It is also, at times, difficult to distinguish it when

the tumor has only advanced to the stage of opacity; provided that the substance of the tumor be very uniform, and the membranous parts not only thin and tender, but adherent amongst themselves and to the contained substance.

The characters of fungoid disease are very much modified by the tissues in which the tumors are developed. Though I shall not attempt to particularize all these variations, I must not wholly pass over the peculiarities which this disease exhibits when it affects the bones. When the fungoid disease takes its origin in a part of the osseous system, bony matter continued from the natural structure forms a striking part of the new growth, through which it often radiates from that part of the bone in or near which the disease commenced. The bone thus formed is of a loose and feeble texture, compared to that of healthy bone. It would appear that the deposit of bony matter only takes place in that part of the tumor which is subjected to the pressure of the periosteum, which is often greatly distended by the new growth: its fibres become separated by this distension; the morbid growth then advances through the opening, proceeds with increased rapidity, and soon loses all trace of bony deposit. It is not common for fungoid tumors to shew any disposition to ossification, except when originating from bone in the manner which I have just described: nevertheless, in some rare instances it is met with, but it presents very different characters from those which are at times observed to accompany true scirrhus. It is not, as in these last cases, the central and most compressed part of the tumor which forms the bed in which the earthy matter is deposited; but the cysts themselves become converted into bony shells, circumscribing their broken-down contents. I have only noticed this phenomenon in some comparatively chronic cases of this disease. I apprehend it is very rare, in this affection, for the morbid growth to remain stationary for a sufficient length of time to admit of the process of ossification being carried on.

Peculiarities
of fungoid
disease
affecting
bone.

Infiltration
of surround-
ing struc-
tures.

Fungoid disease is still more prone than true scirrhus to affect the surrounding structures in the mode which is commonly called infiltration. I do not here undertake to offer an opinion respecting the propriety of this term; which I merely employ, in compliance with habitual usage, to denote a particular state that, I apprehend, will be readily understood.

Affection of
the absor-
bent glands.

This disease, like true scirrhus, also extends to the lymphatic glands, through which the absorbent vessels pass, in their way to the thoracic duct or right trunk. This, however, is not the only mode in which the disease extends from the part first affected. The veins leading from it are said to have been found filled with the cerebriform matter which characterizes this disease, and the fact has been adduced as an argument in favour of venous absorption; whilst, on the other hand, the advocates for lymphatic absorption have, with equal plausibility, brought forward the presence of cerebriform matter, not only in the absorbent glands, but also in the absorbent vessels themselves. The presence of cerebriform matter in either of these sets of vessels is no proof that it has been absorbed by them: on the contrary, it seems far more likely that it had been actually secreted by their own internal surfaces, since the very consistence of this matter seems to shew that it could not have been transmitted through these vessels, like the blood or lymph which they are destined to convey. Though this mode of the extension of a local disease is never exhibited, so far as I am aware, by true scirrhus, it is by no means peculiar to fungoid disease in its suppurating or softening stage: similar phænomena are sometimes observable in both common and scrofulous inflammation.

A disease dependent on adventitious structure, and described by Laennec under the title of 'gummy cancer,' or the 'cancer gelatineuse' of some pathologists, appears to bear the closest relation to fungoid disease, if it be not identical with it. The few cases of this variety that have fallen

under my notice were all situated in the abdomen, either attached to, or situated at no great distance from the alimentary canal, and most commonly in the neighbourhood of the stomach and rectum. It is not very uncommon in connection with tendon or bone, and it may occur in a variety of other structures. It does not appear nearly so prone to contaminate the system as some other forms of malignant disease; yet it does at times invade different organs in the same subject. Most of the specimens of this structure which I have had an opportunity of examining closely, resembled, in their anatomical characters, those ovarian cysts which I described as having broad and extended bases. In fact, there was no appreciable difference either in the structure and arrangement of the cysts or in the composition of their contents. The diseased structure in this variety, whilst fully as soft as the brain-like matter already described, presents a certain degree of translucence or even transparency, with far more tenacity than is ever possessed by the cerebriform matter in its softened state. In consistence, it bears considerable resemblance to extremely thick mucilage or arrow-root, but is somewhat thicker than these substances. This form of cancer affords another illustration of the principle which I explained in a former Lecture; when I remarked, that the products of the disturbed nutrition of a particular part are liable to be modified by the structure of the surrounding natural parts: for it seems probable, that the regular production of mucus on the internal surface of the alimentary canal may have been one means of giving the character to the morbid structure formed beneath the mucous membrane within the parietes of the alimentary canal; such being, as I have already said, one of the most frequent seats of this affection. In one of the best cases which I can call to remembrance, the stomach, not far from its pyloric extremity, was the principal seat of the disease.

I have already noticed, that, notwithstanding the palpably

Connecting
link be-
tween scir-
rhus and
fungus.

distinct characters of the best-marked cases of scirrhus and fungus, the two affections make such reciprocal advances to each other, that, in many instances, it is almost impossible to decide to which of them a particular growth is to be ascribed. Thus, we sometimes find tumors which have all the hardness of scirrhus, with a structure on the large and distinct scale, which is more characteristic of fungus. This intermediate form appears to be an essential and permanent feature of the tumor, rather than to depend on a particular stage of its formation.

Combina-
tions of
scirrhus and
fungus.

We not only meet with the various intermediate gradations between well-marked, true scirrhus and the fungoid disease, but we also find the various combinations of these in the same subject: and it must be admitted, that these facts form the strongest arguments in favour of those who consider that the two diseases are one and the same, and admit of no division. The most common complication of this kind consists in the presence of true scirrhus in one organ—as, for instance, in the mamma—in conjunction with fungoid tumors in others; such as, the liver, spleen, and kidneys. It sometimes, though less frequently, happens, that one part of a tumor has the character of true scirrhus, whilst another part is decidedly fungoid. This complication is generally produced, when, in the progress of the tumor, one part escapes from the containing cyst, and grows under less pressure and with increased supply of nourishment.

Defence of
the distinc-
tion made
between
scirrhus and
fungus.

You will, perhaps, be disposed to query the necessity of making a distinction between affections which pass insensibly into each other, and may be united in one individual. The best answer that I can give is, that, notwithstanding these almost imperceptible gradations, nature herself, towards either extreme, presents such well-marked differences, not only in the tumors themselves, but in their effects, as to render the employment of distinct terms at least convenient. Moreover, not only because authors

who have treated of these affections, but also because medical men, in speaking of them, are continually employing the different names to which I have alluded—although, it must be confessed, in many instances, with a great degree of vagueness, more or less excusable from the very nature of the subject—it appeared necessary that I also should employ them, and, by dwelling on the peculiarities belonging to the different forms when well-marked, not only render the distinction more easy, but also, in defect of positive distinctive characters (such as we may find, for example, in the artificial classification of plants), give that general idea of a natural order which may enable us, in most instances, to refer particular specimens with sufficient accuracy to one or other form. Where the distinction is the most difficult, it is obviously of the least importance.

The most common distinction which appears to arise in the minds of pathologists, when speaking of cancer and fungoid disease, is derived from the hardness of the one, and the comparative softness of the other. Consequently, the first experiment made upon a specimen, after its removal from the body, is to apply the fingers to it with sufficient force to partially crush and injure the specimen. If it be soft, it is generally considered to be fungoid. If it resist with impunity, it is, perhaps, without further inquiry, set down as true scirrhus, which appears to be the same thing with what the vulgar call stone-cancer. Patients labouring under cancer are not unfrequently curious to be informed whether the disease under which they are labouring is stone-cancer, or of a different kind: hence, it is not wonderful that the profession should seek to be familiar with this manual test, which may facilitate their answering the question. There is generally some foundation for current popular opinion; and that which gives rise to the question to which I have alluded, might be adduced as an argument, not only in favour of the reality of the difference, but also of the importance of making it. Hardness alone

Methods of distinguishing cancer from fungoid disease.

Degree of hardness.

LECTURE X.

is, however, by no means an adequate test; although it is, perhaps, the best on which we could singly rely. A fungoid tumor may be hard, when, as is sometimes the case, its enclosing cysts are ossified; but this kind of resistance is very distinct from that of a scirrhus tumor, which, without possessing the hardness of bone, has a firm structure throughout. The peculiarity of the bony character of the rare cases alluded to, will, moreover, generally lead to a further examination, when the cause of doubt, if any existed, would be removed. Tumors enclosed in very dense capsules, without being bony, will sometimes possess a degree of firmness which would render the mere employment of pressure between the thumb and fingers inconclusive. The cases in which fallacy is most likely to occur, are, First, in those instances in which a tumor, depending on a heterologue deposit, and, from its size, form, pretty rapid growth, freedom from acute pain, and other characters, having strong claims to be regarded as fungoid, nevertheless possesses, if not throughout, at least in part, the compact, dense, and consistent character of true scirrhus. Here the verbal distinction is really of no importance, more especially if some of these peculiarities are mentioned at the same time. The second case of probable confusion occurs in some instances, in which a very considerable induration takes place independently of any heterologue formation, and merely resulting from the thickening and condensation of the cellular membrane or some other natural structure, in consequence of common inflammation, or any similar cause, having occasioned a deposit of lymph, which has become contracted and feebly organized. This cause of fallacy has been of sufficient force to induce a distinguished French pathologist to consider such induration as absolutely identical with scirrhus. From this opinion, which induces a confusion very different from that which I last mentioned, I most widely dissent: and I feel persuaded, that however closely indurations of this kind may, in their degree of firm-

Cases in which hardness is fallacious.

ness and resistance, resemble true scirrhus, a careful attention to the indications of internal arrangement and external form, dependent on the mode of formation, will invariably be found to clear up the difficulty, and lead to a distinction which is of no small practical importance. The character deduced from hardness of texture, on which, as I have said, so much stress is laid, is not only judged of by the application of the finger, but by its resistance to the knife: and if it be found to possess the firmness of cartilage or fibro-cartilage, and, in consequence, to produce some degree of noise, or what is called 'cry under the scalpel,' it is set down as scirrhus. These are, however, not infallible indications; since they are met with in scirrhus, in common with the indurations before alluded to. If, on the other hand, the structure be cut through with little resistance, and is either throughout of a soft texture resembling brain, or have the character of coagulable lymph with partial and imperfect opacity; or if the tumor contain cells enclosing blood either solid or fluid, or collections of fluid or grumous character with any degree of sanguinolence; the case is regarded as fungoid, and receives, according to its particular character, some one of the names which I have enumerated, as applied to those tumors which I believe I am correct in stating to be generally included under the term fungoid; viz. encephaloid tumors, cerebriform cancer, medullary sarcoma, spungoid inflammation, fungus medullaris, and fungus hæmatodes. These different appearances, when distinctly marked, will, I believe, be found sufficient to warrant the employment of one or other of these terms: yet it must be confessed, that we do occasionally meet with specimens respecting which the ablest judges are divided. Here, I apprehend, the distinction is of no importance.

Characters
of fungus.

A far greater degree of vascularity in the membranous cysts enclosing fungoid matter, and even in some cases the presence of very distinct though feeble vessels in that material itself, may be regarded as a characteristic difference

Vascularity,
growth, and
size of fun-
gus dissimi-
lar from
those of
scirrhus.

between fungus and scirrhus: yet here, as with every other distinction which could be adduced, the transition is gradual. A most remarkable dissimilarity between true scirrhus and the best-marked cases of fungoid disease is to be found in the rapid growth and prodigious size of the latter. In fact, to this cause may be referred some of the largest tumors of which the records remain in the annals of surgery; as, for example, some remarkable cases described by the late distinguished Hey of Leeds. Amongst the plates in John Bell's Surgery, there are representations of enormous tumors which appear to have been of this kind. In our collection, you may see sufficient proof of the magnitude to which fungoid tumors may attain. A large size may then, in some cases, be appealed to as a distinction between scirrhus and fungus. Yet we must not be misled by the converse. A very small tumor may have quite the fungoid character. Yet even in the smaller fungoid tumors, we may frequently notice that their structure is on a larger scale than in true scirrhus. On this depends another feature of fungoid tumors, which I must not omit to mention. They frequently have a nodulous or lobulated figure, resulting from the irregular protrusion of the secondary tumors. When, as is sometimes the case, these secondary tumors are formed by cysts containing more of fluid than solid matter, we may detect decided fluctuation; but it more frequently happens that the consistence of the contained material is such as to allow of a degree of yielding, not amounting to fluctuation, but which, together with the lobulated form, gives to the fungoid so much of the character of a steatomatous tumour, that the *tactus eruditus*, to which surgeons lay a peculiar claim, will not always enable them to make the distinction.

LECTURE XI.

ON THE

COLOURS OF THE HUMAN TISSUES.

INTRODUCTION OF THE SUBJECT OF COLOUR—THE COLOUR OF TISSUES IS DERIVED FROM THE BLOOD—COLOURS OF MOST COMMON OCCURRENCE—ON RED COLOUR—CAUSES OF THE REDNESS OF THE BLOOD—PURPLE COLOUR AS SEEN IN INSPECTIONS—BLACK COLOUR OF THE BLOOD—PRODUCTION OF BLACK COLOUR BY SUBSIDED INFLAMMATION, SULPHURETTED HYDROGEN, &c.—BLACK PULMONARY MATTER—BLACKNESS OF BRONCHIAL GLANDS—BLACK COLOUR OF CERTAIN SOLID TISSUES—CAUSES WHICH FAVOUR THE PRODUCTION OF BLACK MATTER—ON YELLOW, AS AN ANIMAL COLOUR—YELLOW PRODUCED BY EXTRAVASATION OF BLOOD—YELLOW TINGE OF MUCUS, AND OF ONE CLASS OF ADVENTITIOUS DEPOSIT.—GREEN, AS AN ANIMAL COLOUR—GREENNESS FREQUENTLY CADAVERIC, BUT SEEN DURING LIFE IN VEINS BORDERING ON CANCER, IN THE EXPECTORATION, IN PUS, IN CHLOROSIS, IN ICTERUS.—CYSTIC OXYD—BLUE—BLUENESS OF VEINS—CYANOSIS.—BROWN—LILAC.—WHITENESS—CASES IN WHICH WHITENESS IS OBSERVED; IN THE EMBRYO—IN STRUCTURES NATURALLY WHITE—IN THE SKIN, CELLULAR MEMBRANE, &c.—IN STRUCTURES WHICH HAVE CEASED TO CONVEY RED BLOOD, AS FALSE MEMBRANES, ATROPHIED ORGANS, TISSUES WHICH HAVE BEEN INFLAMED OR INJURED, &c.—WHITE CONSOLIDATION OF LUNG—MEANING OF THE TERM ‘LARDACEOUS SUBSTANCE’—WHITENESS OF SOME MALIGNANT GROWTHS—MOTTLED KIDNEYS—WHITENESS OF TUBERCULAR DEPOSIT—WHITE SECRETIONS, FROM THE MAMMARY GLANDS, FROM THE SEROUS MEMBRANES, FROM THE MUCOUS MEMBRANE OF THE ALIMENTARY CANAL, FALLOPIAN TUBES, AND AIR-PASSAGES—WHITE SECRETIONS ALLIED TO TUBERCULAR MATTER.

GENTLEMEN,

BEFORE I proceed to describe two other forms of malignant disease, namely, cirrosis and melanosis, of which the names and most striking distinctive characters are derived from their peculiar colours, it appears to me desirable to make some observations on the subject of colours as we find them exhibited in the human tissues in health and disease, in order that we may correctly appreciate the value of distinctions in morbid anatomy founded upon this attribute.—Although it is my intention to speak of those colours only

Introduc-
tion of the
subject of
colours . .

which may be met with in the human body, yet I shall avail myself of any illustrations taken from other animals, which may present the same colour, under such particular circumstances as to supply us with interesting facts bearing on the subject.

Assumption made, that all colours are derived from the blood.

Not having any speculative opinions or new chemical facts to offer with respect to the constituent principles which colour the tissues and fluids of animals, I shall assume that they are derived from the blood, and bear a certain degree of relationship to each other. Their formation, probably, does not require any complicated secreting apparatus; and there are reasons to warrant our believing, with respect to some of them at least, that certain physical conditions operate to occasion their production. The familiar instance of a bruise will illustrate two of the points which I have alluded to. Within a very limited space, and in a very short time, we see a variety of colours produced; whence we may infer both the near relation of the colouring principles, and the simplicity of the apparatus essential to their production.

Colours most frequently occurring.

In the higher classes of animals, red, in some shade or other, appears to be the colour the most readily and healthily produced. We find it in the embryo, or its appendages, in a very few hours after its developement has commenced; and the animal continues to be coloured by its vivifying and nutrient fluid, as long as life exists. Whilst this fluid still retains its name of blood, and holds its natural situation in the vessels, we know that the colour may pass from the brightest to the deepest red, acquire a livid or purplish tinge, and thence proceed, through deepening shades of purple and livid, to absolute black. I shall therefore commence with red; and notice the other colours which I have mentioned in succession. Green and yellow are more rarely met with; and the changes which they present, in their derivation from the blood, are less evident and traceable, than in the cases of purple and black.

We not only find a red colour in the first-formed vessels

of the foetal membranes, but, in the developed animal, the chyle and lymph, by which the blood is to be recruited, often assume a faint tinge of this colour. It has been ascribed to iron by several animal chemists. The late Professor Vauquelin, in a Course of Lectures on Animal Chemistry, which I attended, attributed the colour of the blood to a peculiar animal principle; and this idea is adopted by other chemists. 'Hæmotosin' is the name by which this principle is known. Dr. Stevens has paid great attention to the changes of tint which this colouring matter exhibits by a mixture with different chemical re-agents. He states, that both acids and alkalies occasion it to assume a dark colour; which, with the stronger acids, amounts nearly or quite to black, except in the case of carbonic acid. The dark colour imparted to the blood is permanent; but when carbonic acid is removed from the blood, it may resume its bright colour. The transition from arterial to venous blood is, I conceive, with great probability, ascribed to the addition of carbonic acid to the arterial blood. The property of imparting a dark colour to the blood, which acids possess, has long been noticed by those who have paid attention to animal chemistry. This was particularly the case with Drs. Coindet and Christison, and with Dr. Perry of Lausanne. It might have been supposed that nitric acid, from the large quantity of oxygen which it contains, would have formed an exception. This, however, does not appear to be the case, if we may judge from the experiment of Dr. Combe, the author of an elaborate experimental Essay on the effects of nitro-muriatic acid on the system.—The power of neutral salts, and especially those of the serum, to give a bright red to the colouring matter of the blood, may be seen in cases where there is no complication with the admission of oxygen. A patient in this Hospital, who laboured under ovarian dropsy, was tapped; and the fluid evacuated was serous, without being ropy from albumen or mucus. It was slightly sanguinolent. The colouring matter, which

On red colour.

Cause of the red colour of blood.

was of arterial red, immediately subsided as a sediment closely resembling vermilion.—But let the precise mode in which arterial is converted into venous blood be what it may, the fact, as respects the subject before us, remains the same. The blood delayed in its vessels acquires a deeper colour, as every one knows who has seen a part subjected to temporary strangulation. A similar alteration of colour may take place in blood which has escaped from its vessels; as we see in bruised eyes and sanguineous apoplexy. From these considerations, we may be warranted in concluding, when we find a part preternaturally livid, that the blood has, from some cause or other, been retarded or removed from those influences which are destined to restore and maintain its arterial character.

Indications
afforded by
purple co-
lour in *post-*
mortem ex-
aminations.

A purple or livid colour is often discovered in the examination of diseased appearances, and is occasionally the most striking circumstance which arrests our notice. We must not, however, at once admit it as a proof either of inflammation or congestion. Before we can decide as to the value and importance to be ascribed to this appearance, we must be aware of the mode of the patient's death, and of the position in which the body had lain, either subsequently to death, or a short time before it took place. If the deep purple or livid colour concur with distension of the veins, if the parts have had an inferior or depending position, and the cellular structure of the part be little if at all altered, as to form or lacerability, we may infer that the appearance, if not purely cadaveric, is at least the effect of a congestion that has taken place a short time before death. If the effect had been produced either by an inflammatory or passive congestion, or even by extravasation, there would be both an alteration of texture, and the modification of colour corresponding with it.

Black co-
lour of the
blood.

When blood has been long retained in small vessels, it frequently acquires, instead of a dark purple, a positively black colour. Some years ago, I suggested that the retar-

dation of the blood was one cause of this colour ; and I see no reason to recede from that opinion, since the cases in which it is met with seem, without exception, to favour it. We occasionally find it, to a greater or less extent, in the serous membranes, where inflammation has taken place, but has subsided before death. When, in these cases, the quantity of black matter is very small, we may easily be satisfied that it depends on an alteration of the blood in the vessels, since it marks their ramifications as distinctly as when they are injected with red blood. This appearance may often be noticed, forming greyish areolæ around spots where a partial adhesion has taken place, and more especially around small tubercles beneath the serous membranes. I believe that, in these cases, the vessels, which, during the existence of inflammation, were distended with red blood, have not had sufficient tone, on the subsidence of the inflammation, to return to their original size, and consequently have allowed a small quantity of blood to remain stagnant in them. Sometimes, instead of a few grey and black spots, a considerable extent of serous membrane, with the cellular membrane beneath it, and the false membrane, if such should have been formed on its surface, are deeply coloured, and loaded with black matter, after the subsidence of inflammation. Such instances have, I believe, not unfrequently been described as cases of melanosis ; and one of my principal reasons for bringing forward the subject of colour now, is, to make sensible the difference which I conceive to exist between these cases, and those of true melanosis, which I shall subsequently have to describe to you. The case of E. Bindle, already narrated (p. 234), will serve to illustrate the extent to which this deposition of black may take place, after peritonitis. The production of black matter, whether to a large or small extent, is certainly much more common in the peritoneum, than in the other serous membranes : nevertheless, I have seen it repeatedly in the pleuræ, and occasionally in connection with the arachnoid.

Production
of black
matter in
serous
membranes.

It is not only necessary to distinguish this black matter,

Black colour produced by sulphuretted hydrogen.

when it occurs simply, from those cases of malignant disease constituting melanosis, but it is also necessary not to confound with it those cases in which a dark colour has been produced by sulphuretted hydrogen, where it is almost always to be regarded as a cadaveric appearance. In general, this cadaveric colour is more uniformly diffused than the dark colour produced by the mere stagnation of blood in the vessels; and its colour has more of a leaden hue, than of a perfect carbonaceous black, which we meet with in the preceding cases: yet it must be admitted, that, at times, the distinction is not easily made. Both cases so far resemble each other, that they are to be ascribed to an alteration of the colouring matter in the blood; but in the cadaveric appearance, the blood, already altered in character, has generally transuded and soaked the tissue, which then becomes uniformly discoloured.

Production of black matter in mucous membranes.

The production of black matter is by no means uncommon in the mucous membranes: but in this situation it is more difficult to distinguish the black colour produced by stains of the blood, from that which is caused by sulphuretted hydrogen; since, even when proceeding from this latter cause, it may be distinctly situated in the vessels. In the mucous membrane some of the best examples of the productions of black pigment, from delay of the blood, are found in connection with the cicatrices of old ulcers of the intestines. It may also be seen forming arborescent areolæ around the mucous follicles, when they have been inflamed: and it may be met with in almost every part of the mucous membrane itself, both in the large and small intestines. It sometimes occurs in extremely minute points, requiring very close inspection, or even the assistance of a glass to view them separately, and producing, by their number and proximity, various shades of grey: in other cases it is much more abundant. In these examples, it is not very unfrequent to observe one part of a small vessel quite black, whilst another portion is of a deep-red or purple.

The black, grey, and slate-coloured hues presented by

the mucous membranes, and more especially by that of the alimentary canal, have been insisted upon by two very distinguished French pathologists, Andral and Dalmas, jun., as indicative of chronic inflammation of the parts so affected. This colour may, it is true, be often accompanied by some alteration of texture, resulting from inflammation; but I believe that the inflammatory process must have subsided when the discoloration takes place, and that it may long continue when inflammation is at an end. My friend Dr. Bright has adopted the same conclusion, which he has stated in the first part of his magnificent work. I shall have occasion again to notice this subject, in treating of the morbid anatomy of the mucous membrane.

Are black and grey colours in mucous membranes evidences of inflammation?

The production of black matter is perhaps no where more frequent than in the lungs; where it is almost invariably met with, except in very young subjects, and is known by the name of black pulmonary matter. It is sometimes so abundant, as almost to form the sole colour of the lung. Laennec has strongly insisted on the importance of distinguishing this state of the lung from that dependent on melanosis. In many, and perhaps in most instances, it is probably an effect slowly and gradually produced; yet even in these cases it is, perhaps, to be attributed to some slight impediment to respiration, interfering with the separation of carbon from the blood. In other cases in which it occurs more abundantly, but less uniformly, it is to be regarded as a sequel, either to pulmonary apoplexy, or to pneumonia, which has produced red hepatization. These cases of black matter produced within the body must not be confounded with those in which the accumulation of black matter is the result of carbonaceous matter received with the inspired air, of which striking examples have been published by the late Dr. J. C. Gregory and Dr. W. Thomson.

Production of black matter in the lungs.

Black matter not unfrequently finds its way into the air-passages; and is thrown off, during life, intimately intermixed with the sputa: it appears to be the effect of a con-

Production of black matter in the bronchial tubes.

gested state of the lungs and bronchial membrane. I was particularly struck with it in the case of a plethoric young woman, who was labouring under a pulmonary catarrh, in conjunction with amenorrhœa: and I can at any time produce the same appearance in my own person, by long continued quick running, which has the effect of forcibly injecting the mucous membrane of the air-passages. Sputa, thus discoloured, have been by some persons attributed to the bronchial glands; but I am not aware of any glands which secrete black matter, and communicate with the air-passages. I have never seen the follicles of this mucous membrane discoloured with black matter; but the mucous membrane itself may be so. The synovial membranes of the sheaths of tendons are occasionally discoloured with small spots of black matter, which, as in the case of the serous and mucous membranes, may frequently be seen to be situated in small vessels.

Black matter in the bronchial glands.

I shall now proceed to notice the cases in which black matter occurs in more solid textures. The bronchial glands unquestionably claim to be mentioned among the first of these. The occurrence of black matter in these bodies is so very frequent, that it can scarcely be regarded as abnormal; and the inconvenience, if any, which results from it, is so slight, as to escape attention. From the situation and office of these glands, there is certainly some reason to suspect that they receive their black matter from the lungs; since we have already seen, that the black pigment is extensively produced in these organs, and the glands themselves do not appear to receive so large a quantity of blood, or to be subject to those congestions which I believe are principal causes of the production of this matter. On the other hand, I know of no proof of the black matter being taken up by lymphatic vessels; and the analogy of many other colouring substances is against it. It must however be remembered, that if very small and imperceptible quantities were taken up, it would, in process

of time, be sufficient to produce the effect which we find, provided it were arrested in its progress through the gland.

The absorbent glands in the abdomen sometimes afford an example of a partial, but rarely of a complete colouring from this pigment. It is natural, though in a very small quantity, in the *crura cerebri*, causing what is called the *locus niger*; although, in this situation, it is so diluted as to appear rather grey than black. We do not often meet with a black pigment diffused in the substance of solid parts, except in conjunction with that peculiar form of malignant disease to which the name of *melanosis* is given;—the consideration of which I defer for the present. Black matter is, however, sometimes met with in a diffused form in the cellular structure, as a sequel to extravasation of blood: the vascular membranes which enclose encephaloid tumors sometimes acquire a black colour, and form a connecting link between this variety of malignant disease and *melanosis*. In the inferior animals we find a deposition of black matter in internal parts, independently of any morbid action. In sheep, the membranes of the brain at the anterior part, especially about the olfactory nerves, are often pervaded with black matter. The presence of this pigment in the periosteum of Guinea-fowls is another instance, which is quite notorious.

Although I believe the production of black matter to be very much, and perhaps principally, promoted by local causes, affecting the circulation of the blood in the parts in which it is met with, yet I believe that there is a particular state of the constitution which favours the production of the pigment. To a slight extent this may be natural, and may merely occasion a dark complexion, dark eyes, and dark appendices to the skin, as in the cases noticed in the paper of Heusinger. This natural state of the constitution is sometimes considerably increased, and in other cases apparently produced, by disease. In some affections of the

Production of black matter in glands in the abdomen;—

in the *crura cerebri*;—

in cellular membrane;—

in inferior animals.

Conditions favourable to the production of black matter.

heart, for example, I have known the skin to assume a swarthy appearance, from an increased quantity of colouring matter in the rete mucosum; the increased deposition taking place in those parts of the skin which are naturally of the deepest colour, such as the axillæ and neighbourhood of the nipples; and also in parts exposed to the atmosphere, such as the neck and arms. The affections of the heart, to which I have alluded as producing this effect, are such as are calculated to create a languid circulation; and are rather connected with the muscular substance than with the valvular apparatus.

Dark colour
produced by
terror.

A similar dark colour of the skin has been suddenly produced by the influence of terror. Professor Rostan has noticed some cases of this kind; the most remarkable of which was that of a female, who, during the horrors of the French Revolution, was condemned to the guillotine. She was reprieved, but the shock which she had received occasioned her skin to become very dark. It remained in this state till her death, which occurred some years afterwards. A careful examination of the texture of the skin discovered that its blackness was produced by a deposit of pigment in that part of the tissue in which its presence is natural in the dark races of mankind.

There is another form of constitutional tendency to the production of this matter, which is much more striking, and occasions more or less deep discoloration of internal parts, especially of such as are membranous. It is probably closely allied to scorbutus, or purpura hæmorrhagica, and perhaps most frequently concurs with true melanosis. It may either be the cause, or the effect, of the peculiar form of that malignant disease; but I believe it may exist solely as a discoloration of natural and pre-existing parts, unaccompanied by any adventitious structure. The records of such cases are mixed up, and confounded with, those of true melanosis: but it is quite essential to establish a distinction between them.

The next colour of which I shall speak, is yellow. In the human subject, this colour is rarely if ever met with as that of a tissue, except as a pathological appearance: for I can scarcely regard the yellow colour of fat, of elastic ligament, and, in some degree, of the coats of arteries, as connected, either with the bile, or the peculiar pigment of which I am at present to speak. It is well known that many of the tissues of the body, as well as the fluids, may acquire a yellow colour in jaundice; and the cause of this appearance is, without difficulty, traced to the presence of bile in the blood. Of the characteristic production of this colour in yellow fever, I have nothing to offer from personal observation; and do not know whether it may be regarded as dependent on bile, or not. There is, however, in some unhealthy conditions of the system, a more or less general sallowness of the skin, which appears to be caused by the presence of a small quantity of colouring matter, without being at all dependent on the diffusion of bile through the system. We sometimes see it in the cachectic state, which accompanies cancer; but it may exist independently of that disease.

I shall now proceed to notice cases in which the yellow colouring matter is met with in a more aggregate and tangible form than in the preceding instances. When an extensive bruise has been inflicted on any part of the surface of the body—amongst the variety of hues which, in the course of a few days, the injured spot may assume, yellow is often one of the most conspicuous. It probably, in part, depends on extravasated blood; though I believe that, in these cases, it is seldom observed in those parts in which the extravasation is most considerable; but, on the contrary, about the circumference, where it fades away into the surrounding healthy skin. When blood has been extravasated to a larger amount in the interior of the body, it is by no means uncommon to see a portion of the coagulum assume a yellowish colour, somewhat like that of ochre, and thence

On yellow.

Production of a yellow colour by extravasation of blood.

passing into orange or reddish brown. I have seen this colour in a sanguineous tumor, removed from the fleshy part of a limb. It may also be seen in the lung, after pulmonary apoplexy; and, if we may judge from the histories of the cases in which it was met with, it would seem that the change in the coagulum from red to yellow is a slow process. To this circumstance I wish particular attention to be paid, as some inferences of practical importance may be deduced from it. The most striking instances of the production of this colour are those which we meet with in the brain, after sanguineous apoplexy, which, if the patient survive a considerable time, gives rise to an ochre-yellow cyst, which has been particularly described by Riobe and Rochoux. Spots of the same colour also occur on the surface of the brain, when fatal injuries to the head have not caused immediate death: they are probably produced by extravasation of blood from the pia mater. A similar colour is likewise met with in some cases of softening of the brain. It may be queried, whether this remarkable disposition to the production of yellow matter, which certainly occurs in the brain, is wholly to be ascribed to the situation in which the effused blood is placed? or whether something be due to the admixture of cerebral substance with it?

Yellow
tinge of
secretions
from mu-
cous mem-
branes.

The secretion from the mucous membranes is liable to be slightly tinged with yellow; which is far from being an uncommon case. It is, in some cases, of a bright camboge-yellow colour. I believe that such appearances are generally the result of a high degree of active inflammatory action, and are very closely allied to those cases in which the secretion becomes very slightly but diffusively sanguinolent. I have not only made observations on which this idea is founded; but in an instance which came under my notice, in which the yellow colour of the mucus was the most striking and remarkable, its production was preceded by intense pain, and other symptoms of inflammation in the frontal sinuses.

The adventitious structures which I have comprised under

the varieties of fungoid disease are sometimes coloured with yellow; as I shall have occasion to notice, in speaking of cirrosis, a form of malignant disease described by Laennec. The membranes of the brain and spinal chord have been found of a slightly yellow colour, in a fœtus dissected by Lobstein, and recorded in Breschet's Repertory of Surgery and Pathological Anatomy. This author gives the affection producing these cases the name of 'Kirronose'; but it differs essentially from that to which Laennec has given a similar appellation.

Though green is by no means a common colour in a living or very recently dead human subject, either in health or disease, yet it must not be wholly passed over; since it is not only pretty frequent amongst cadaveric appearances, but is occasionally met with in our tissues and fluids, as well as in those of inferior animals. Like the colours of which I have been speaking, it is produced as one of the effects of a superficial bruise. It is very abundant, and perfectly natural, in the maternal part of the placenta of the dog. I examined some taken from that situation, and found it to be a very intense pigment, susceptible of much dilution, and not materially altered either by alkalies or several acids. Its appearance very much resembled that of sap-green, like which, when condensed, it appeared nearly black. There is a small slender fish, the hornpike, found in company with mackarel, and at some seasons not uncommon in the London market, the bones of which are of a brightish-green colour, more especially in those parts of the bones which in other fish are of a red colour. From this, as well as from the preceding instances, we may infer, that this colour, like the black and yellow pigments, is deduced by an easy transition from the colouring matter of blood.

Of green, as
an animal
colour.

As a cadaveric appearance, we sometimes meet with this colour, of a beautiful and delicate shade, in the muscles, which in life owe their red colour directly, as well as indi-

Green, as a
cadaveric
appearance.

rectly, to the blood. A green tinge is not unfrequently met with, after death, in the mucous membrane of the alimentary canal and bronchial tubes. Though in this situation, as well as in the muscles, it may be a cadaveric appearance, I suspect, for reasons which I shall presently offer, that it sometimes exists during life. When the surface of the body, after death, presents a green colour, it takes place in those parts in which there are either cadaveric congestions, or in the neighbourhood of considerable veins.

Green colour of fluids during life.

As instances of the fluids acquiring this colour during life, I may mention the blood of the veins in the neighbourhood of some cancerous tumors becoming of a dingy green, approaching to olive. This has probably been seen, by most surgeons, in the removal of the mamma, for malignant disease. The sputa rejected from the air-passages, in some cases of catarrh, not unfrequently put on a greenish colour, at which fanciful patients are apt to be more or less alarmed: there is, however, no cause for these feelings, but, on the contrary, we may infer, from the sputum presenting this colour, that the irritation of the affected membrane is subsiding. It is from these cases of green-coloured sputum that I am induced to suspect that the greenish colour of the bronchial membrane, which we occasionally meet with, is not necessarily cadaveric, but may have occurred during life; for I have repeatedly observed the mucus, lubricating a part, to be of the same hue with the part which it covers. Pus is occasionally of a greenish colour. This is, perhaps, most strikingly met with within the cranium, where it may either exist in pus beneath the arachnoid, and infiltrating the pia mater, or in abscesses in the substance of the brain. The softened brain substance, which sometimes assumes in a great measure the character of abscess, is also, in some instances, of a greenish colour. The approach to a green hue, in patients who are labouring under chlorosis, is probably dependent, in part, on the fluids, and in part on the

Green colour in chlorosis.

solids; but I have no positive facts to offer in connection with this affection, except that, on one occasion, I observed blood drawn from a chlorotic female to be of a dingy colour, and to be covered, after coagulation, with a thin dirty buff.

Almost every one must have repeatedly seen the serum, when separated from the crassamentum, of a yellowish green colour: but as this may have been owing to an admixture of bile, I do not wish to urge its connection with the cases which I have been mentioning; since it may rather belong to the following cases, in which the green colour is decidedly referrible to bile. Every one who has been in the habit of witnessing inspections, must have repeatedly observed the bile in the gall-bladder to be of a green or olive colour, instead of yellow; and the coats of the gall-bladder to have assumed the same colour: whilst it is much more uncommon to find that the bile in the ducts of the liver has lost its yellow colour: hence I think we may infer, that the greenness has often been acquired after the bile has been secreted. In other instances, the bile appears to assume even a bright-green colour from intermixture with the contents of the alimentary canal, as may frequently be seen in cases of bilious vomiting. When the bile is obstructed in its course to the intestines, the communications between the ducts and sanguiferous vessels of the liver are sufficiently ready to allow of the bile passing rapidly into the circulation, and colouring the different parts of the body, which, in consequence, generally assume a yellow colour, constituting what is termed jaundice. The colour so communicated, it is well known, is not always yellow, but occasionally olive or greenish. It would not be easy to determine, *à priori*, whether the greenness in these instances is to be referred to alteration in the bile, by admixtures to which it may be exposed after leaving the liver; or whether the bile has already assumed this colour before its diffusion. Experience has taught us, however, that this

Green colour dependent on the presence of bile.

Icterus.

Fungoid
disease is
the most
frequent
cause of
the green
jaundice.

deviation from the ordinary colour of jaundice belongs to those cases in which the obstruction is the most obstinate, and in which we often find, in examination after death, permanent obstruction to the principal ducts, which are greatly dilated; and that the smaller ducts have likewise their peculiar obstructions. Fungoid tubercles, scattered through the substance of the liver, are the most common causes of this obstruction: the substance of the liver is, at the same time, deeply tinged with olive-coloured bile. If, in conjunction with the chronic character of these cases, we revert to the fact before noticed, that the bile is often of a greenish colour in the gall-bladder, whilst it is yellow in the hepatic ducts, we shall, I conceive, find a further confirmation of our suspicion that the bile may acquire this colour by retention. In some cases in which the smaller gall-ducts have their peculiar obstacles, we may find partial accumulations in cavities in the substance of the liver, in which the bile is thick and grumous, and of the colour of mineral green; whilst the bile in the unobstructed ducts may continue yellow. In the cases of fungoid tubercles of the liver, the retention takes place in the liver itself: the bile becomes green: the substance of the liver, like the coats of the gall-bladder, acquires the same colour: and when this effect has taken place, the bile is probably secreted no longer of a yellow, but of a greenish colour.

Cystic oxyd.

That rare variety of urinary calculus to which Dr. Wollaston gave the name of 'cystic oxyd,' but which has since been known to be formed in the kidneys, is generally, if not invariably, of a crystalline form, and, when recent, of a wine or wax-yellow colour. By exposure to light, this yellow is converted into green, in which, after a considerable time, blue predominates.

Blue, as an
animal co-
lour.

Although we occasionally see some parts of the human subject, and very frequently particular parts of some inferior animals, presenting a blue colour, yet I am not aware of a single instance in which this colour appears to belong to the

tissue itself. It seems rather to depend on the colour of the blood in the vessels of the parts which present it; yet the blood itself, which occasions this colour, is perhaps never blue. The fact appears to be, that when the blood has passed from the state of arterial to venous, and become of a decidedly purple colour, the tissues of parts apparently blue, although translucent, do not transmit all the elements of purple light, but suffer the blue rays to pass in preference to the red. I believe that the parts which generally present the blue colour, from this cause, are in reality nearly white. Almost every one must be aware that the superficial veins, when in a turgid state, are readily distinguished, not only by their prominence, but by their blueish colour. The same thing may be seen in deeper-seated veins, when laid bare in operation: but if the venous tissue be remarkably thin and transparent, the veins will exhibit the purple colour of the blood it conveys. It is not uncommon to see the lips of a deep blue colour in persons affected with very severe bronchitis; but this appearance is most remarkable in those individuals who labour under some malformation of the heart, more especially a deficiency either in the septum of the auricles, or that of the ventricles. It is well known, that in these last cases the blue colour is not confined to the lips, or even to the countenance, but extends to every other part of the surface capable of receiving a considerable quantity of blood; in so much, that the terms 'blue disease' and 'cyanosis' are applied to them. In all of these cases, the blue colour is occasioned by the diffusion of highly venous blood seen through the nearly-colourless tissue interposed between it and the eye. It is most conspicuous in the lips, not only because the membrane covering them invests a highly vascular structure, but because, from its thinness, it does not conceal those small vessels which would be imperceptible beneath the integuments of other parts.

Blueness of the surface in bronchitis and heart-disease.

Amongst the inferior animals, I can adduce no more

Blue in the
lower ani-
mals.

familiar and striking instance of the occurrence of the blue colour, than that which is presented by the neck of the common turkey-cock. When this animal is dead, the unfledged skin which covers the caruncles about his neck appears to be of a dead white; but during life, they appear either white, red, or blue, according as it remains nearly exsanguine, or is injected with arterial or venous blood. The oblong naked spots on the cheeks of the mandril are remarkable for the bright blue colour which they present, and which, I suppose, is produced in the same manner as that in the turkey-cock's neck.

Brown, as
an animal
colour.

I have now mentioned the principal facts which occur to me respecting the most important appearances presented by colour in our tissues and fluids. There are, of course, many varieties of shades and intermediate hues which it is needless for me to attempt to particularize, but there are two or three which claim some attention. Thus there are different shades of brown which we meet with where blood has been effused or congested. These appear to result from the intermixture of some portions which are passing into the yellow colour with others which still retain the character of dark blood. This kind of brown is not an unfrequent colour in cerebral apoplexy: it is also seen in pulmonary apoplexy, and in sanguineous tumors. In a tumor of this kind removed by my friend T. Callaway, the larger portion of extravasated blood had acquired a tan colour; whilst a smaller portion, apparently of much longer standing, was nearly colourless. I have had occasion to notice what appeared to me a remarkable fact connected with the dark-brown and nearly black colouring matter occasionally produced in particular parts, and resulting apparently from partial gangrene, or a state approaching to it. In the cases to which I allude, not only the solid parts, but the fluids infiltrating them, were deeply coloured. These fluids had the effect of fixing an indelible stain upon the skin and nails of the fingers, almost resembling that from nitrate of

silver, or nitrate of quicksilver. In a case of this kind, a stain in the latter situation remained for nearly two months.

Another colour which I must allude to, is lilac, or a near approach to it. The most striking examples of this colour are met with in some cases where the spleen is greatly softened; and in which this state cannot be ascribed to a cadaveric change, since it is met with in the most recent inspections, and whilst the warmth of the subject is still considerable. I believe it is to be ascribed to the dilution of purple blood with a soft, opaque, colourless deposit, probably of an inflammatory character. The lilac colour is also occasionally met with in those globular masses which are attached to the internal surface of the heart, and are membranous externally, and of a grumous consistence internally. They appear to be principally formed by the fibrin of the blood; but the coloured particles are not wholly absent: hence the colour of the grumous mass, as in the case of the softened spleen, may be attributed to the colouring matter of the blood, diluted with opaque whitish matter, in a softened state.

Lilac, as an animal colour.

I must not quit the subject of colour, without noticing whiteness, as it presents itself both in solid parts and secretions. It will not be enough simply to ascribe this to the absence of the colouring matter; but it will be necessary to inquire into the circumstances which promote or attend its absence. 1. In the earliest periods of existence, colouring matter is absent, not having yet been produced. 2. After the colouring matter has been formed, there are still some parts which, in their natural state, do not require the colouring matter to penetrate them. 3. Others receive but little colouring matter; and this is so slightly retained in the tissue, that it is only visible during life, and whilst the circulation is pretty active; but the part appears quite pale after death, or when the circulation is languid, and the quantity of blood in the system reduced. 4. There are, again, other parts, both amongst those natural to the body, and those

Whiteness of tissues.

which are occasionally added to it by adventitious production, which at first receive the red blood, but eventually cease to do so, and present a white colour.

1. Paleness
of the em-
bryo.

Of the paleness attendant on the first periods of existence, I need say nothing; except to remark, that in a very few hours, scarcely twenty-four, the appearance of colouring matter may be seen in the case of oviparous animals: nevertheless, several days must elapse before the colouring matter is at all diffused through the embryo.

2. Persistent
whiteness of
cartilage &c.

As instances of the second class, or of structures into which colouring matter does not enter, though it may have been produced in the body, I may point out articular cartilage, fibro-cartilage, elastic ligament, and enamel.

3. White-
ness of skin,
cellular
membrane,
&c.

Almost every part of the surface of the body may be adduced as an instance of the third class; in which parts receive colour when the circulation is active, but become pale when it is languid, or ceases. This is very manifest in most parts of the skin. Such is also the case with the cellular membrane; for, though susceptible of being intensely reddened by injection, it allows the complete retirement of the red particles from its vessels, and becomes white or colourless. Every one must be familiar with its snowy whiteness, or rather foam-like appearance, as it is exhibited in recently-killed veal. There are many parts which retain the colour which they owe to the injection of their vessels, much more strongly than the skin and the cellular membrane; so strongly indeed, that the colour almost appears fixed in and essential to them; which, when the system has been slowly and almost completely deprived of blood, constituting a state which is described as general anæmia, become pale, and nearly white. This is sometimes strikingly the case with the kidneys; and as it more often occurs in a part than in the whole of the organ, it produces a mottled appearance; which it is important not to confound with the mottled and light-coloured appearance of the kidney occasioned by a morbid change, which has been

described by Dr. Bright. The tongue and the lips frequently, the corpora cavernosa occasionally, and even the thyroid gland, may become pale in this manner.

The fourth class, or those which, having originally possessed red vessels, subsequently cease to do so, present matter of more pathological interest than any of the preceding classes. The best instance I can adduce from the normal state of the body, is furnished by the eye; in which, in the fœtal state, it is well known that a red vessel occupies a situation which, in the perfect animal, requires the most complete transparency. A process similar to that which, about the period of birth, removes this small branch of the arteria centralis retinae, takes place in many newly-formed parts; which, though at first highly vascular, and consequently redder than many other tissues, ultimately become nearly or quite white, from the diminution and obliteration of their vessels. This is conspicuously seen on the surface of the body after extensive burns which have caused deep ulceration. The same thing, as I have already observed, is also seen in false membranes formed on the serous membranes; which, when first organized, are often copiously supplied with red vessels, so as to give them, at times, almost the appearance of muscle; yet, eventually, these membranes become pale, and nearly or quite white. Though, on the serous membranes, these false membranes frequently assume, in their permanent state, all the characters of cellular membrane, yet, as we have seen, they exhibit, in other instances, every variety of texture, up to fibro-cartilage, and even bone. In other situations, the adventitious product of inflammation is generally found in a condensed and solid form, rather than in that of cellular membrane. In its permanent state, it loses its sensible vascularity, and becomes of a white colour, constituting what Laennec calls 'tissue blanc non fibreux.' This is also the structure into which several parts natural to the body resolve themselves, when their nutrition is modified on their ceasing to serve

4. Whiteness of parts which have ceased to carry red blood.

Whiteness of old false membranes.

Whiteness of atrophied structures.

any useful purpose in the animal economy. The ductus arteriosus, the round ligament of the liver, the urachus, the remnants of the thymus gland, naturally degenerate into this tissue: and the same change may happen to parts which, from some accidental cause, have ceased to perform their function; as, for example, obliterated arteries and veins, and even more solid structures, as the kidney, testicle, or ovary. It is this same structure which presents the whiteness so conspicuous in cicatrices; both those which are presented during life on the surface of the body, and such as are formed internally in organs or parts injured by disease or accident. Some of the best examples of this kind are furnished by the liver, spleen, kidneys, and lungs. The contracted parietes of an old abscess, which has long since ceased to secrete, and is either closed on itself, or incloses the inert and solid remains of its inorganizable secretion, generally consist of the same substance, and, for the most part, present a white colour. It may however happen, that this white ground is tinged by the presence of some of the colouring matters which I have already described, more especially the black and the yellow.

Whiteness
of organs
after injury
or disease.

Whiteness is sometimes the result of the disappearance of colouring matter, even when it does not seem to have been contained in vessels, and when the blanching cannot be attributed to their obliteration. Without attempting to explain the process by which this takes place, I shall merely illustrate, by examples, the cases in which it occurs. I have already had occasion to notice the transition from red to brown and yellow, which is known to take place in extravasated blood, and in parts deeply coloured by blood in this state. It sometimes happens, that these colours become progressively paler, until the solid substance presents almost absolute whiteness. A very striking instance of this kind occurred in a small sub-cutaneous tumor in the thigh, which was removed by my friend T. Callaway, and which evidently depended on extravasated blood. The indurated and

Whiteness
following
extravasation
of
blood.

defined portions of spleen resulting from violence, which I have noticed in a paper laid before the Royal Medical and Chirurgical Society, and which generally present a shade of brown, sometimes pass into white; but they are then remarkably firm and contracted, and, in fact, appear to have become specimens of the non-fibrous white tissue already mentioned. It is in the lungs that whiteness, of the kind of which I am now speaking, is of the most interest, as a pathological appearance. It is not, however, as a pure white that it is often presented to our view in this organ: it is more frequently dashed with red, or grey, or black pulmonary matter. The consolidation of the lungs has been commonly described as red, grey, or white hepatization. It is not, however, every form of the white and the grey consolidation, as Andral more correctly calls it, which is to be regarded as the result of a transition of the kind of which I am speaking. I wish to be understood as excluding those cases in which the consolidating effusion appears to have been originally white; and also those cases which are correctly regarded as occasioned by tuberculous infiltration. When these cases are set aside, there will yet remain others, of grey or white consolidation; in which, so far as we can judge from a careful examination of different parts of the same lung, it appears that the portions which are white, or of a light colour, had been previously red. We may, in fact, find different portions of the inflamed lung presenting most of the steps of the transition. I think, however, I am correct in stating, that the preceding redness in these cases is generally lighter and brighter than that exhibited by other forms of red consolidation, which are often so deep and dark as closely to resemble cadaveric infiltration, or even pulmonary apoplexy.

There are two or three other white or light-coloured solid productions, which claim a little attention, before I notice the white fluids or secretions. There is a substance not unfrequently mentioned by pathological

White consolidation of pulmonary texture.

Lardaceous tissue.

anatomists, but more especially those of foreign schools, under the name of 'lardaceous matter,' from its supposed resemblance, both in texture and colour, to the white fat of bacon. I confess that I am not able very confidently to define the meaning of this term; but I conceive it to be used to designate, First, one of the forms of the product of inflammation which I have already described to you, in treating of the serous membranes. It appears to be intermediate, between the inorganizable and plastic forms: like the latter, it is concrete and coherent, but to an inferior degree, being accompanied with a kind of friability, or shortness, which probably constitutes a part of its supposed resemblance to the fat of bacon. It might, for the same reason, be almost as aptly compared to raw turnip, or some other vegetable substance; one or other simile being more expressive, according to differences of appearance which the lardaceous substance itself may present. On the other hand, it approaches to the former or non-plastic form of inflammation, in its insusceptibility of organization: hence it is ill adapted to continue as a permanent structure; whilst, from its texture being unyielding, compared with that of adventitious cellular membrane, it affords far more serious impediment to the performance of functions in those organs about which it is deposited. I believe it to be closely allied to those deposits which are regarded as of scrofulous character, if it be not more correct to place it absolutely in that class. When it exists in no great quantity, and is accompanied by deposit of a more plastic character, I believe it may become, to a certain degree, permanent, and cease to be a cause of inflammatory irritation. In such cases, it would be likely to assume the character of fibro-cartilage. The only situations in which this form of lardaceous substance is wont to occur, is on both surfaces of the serous membranes, or infiltrating the cellular membrane where this texture is abundant and loose.

I believe the term 'lardaceous substance' is occasionally

applied to products of a malignant character, and more especially to some which are nearly allied to fungoid disease; and which, whilst they want the firmness of true scirrhus, are nevertheless much firmer, and less vascular, than those tumors which receive the appellations of fungus hæmatodes and fungus medullaris. This application of the term 'lardaceous substance' I consider unfortunate, since it tends to a confusion of ideas. I mention it, to point out the propriety of avoiding it; and shall rather consider this form of white deposit under the next head, or that under which I shall have to notice whiteness as the result of malignant disease.

It is needless for me to repeat the description which I have already given of those adventitious structures: and I have only to remind you, that whilst, from various causes, they assume different colours, there are some which, from their whiteness, have received particular appellations, which require mention here. True scirrhus, when arrived at that stage in which death and softening are only about to commence, is generally of a whitish colour. The coagulated secretion filling the cysts which constitute the basis of a fungoid tumor, though often translucent or transparent, soon becomes opaque; and in this stage, when it presents a nearly pure and dead white, if it have received few or not any vessels, and have not been discoloured by extravasated blood from the vessels of the containing membrane, it has received different designations, according to its degree of firmness. When its power of resistance is considerable, it has been called, as I have just remarked, 'lardaceous': at other times, it has been termed 'fibro-cartilaginous,' or nearly so. The pancreatic tumor of Abernethy is, I believe, a variety of this kind, differing from the former in consequence of the greater distinctness of the secondary and tertiary cysts, of which the mass is made up; and, in fact, approaching more nearly to the non-malignant tumors dependent on compound serous cysts, to which the term 'hydatid' has been erroneously applied. If the white fungoid

The term 'lardaceous substance' misapplied to malignant growths.

Whiteness of some malignant growths.

Pancreatic tumor.

matter is softer than in the preceding forms, which is often the case when the enclosing membranes are of large size, or extremely thin and tender, it is called 'cerebriform,' or 'medullary,' from its resemblance to the white substance of the brain. When it is still softer than this, it becomes almost fluid, and nearly or quite loses the traces of its original structure, from the breaking down of the containing membranes: and in this form, I believe it to constitute the tumor which Dr. Munro has described as a specific form, under the name of 'milk-like tumor.' When the structures surrounding the original adventitious growth become inflamed, they are apt to be infiltrated, as I have already remarked, with an effusion very similar to that of which the tumor is composed; and consequently appear to degenerate into a medullary, milk-like, or, as some will have it, lardaceous character.

Milk-like
tumor.

Whiteness
of hyper-
trophied
glands.

The absorbent glands are liable to a very remarkable increase of size, in consequence, as it appears, of a general hypertrophy, in which the superadded substance is frequently of a light or nearly white colour: it is quite distinct from malignant disease; and also differs from the scrofulous and tuberculous deposit, which is another of the white solid productions presently to be brought under your notice.

Mottled
kidneys.

The kidneys are subject to a very remarkable light-coloured, or white, diffused deposit, constituting a most important disease, which has been ably elucidated by Dr. Bright: this deposit is neither malignant, nor, strictly speaking, tuberculous.

Whiteness
of tubercu-
lar deposits.

The scrofulous deposit, or, as it is called, the tuberculous, when this term is used to indicate a particular substance rather than form, appears to constitute a secretion, and not an adventitious tissue; yet, as it has been placed by some pathologists among this latter class, I shall notice it in this place, before proceeding to speak of the white secretions to which it may form a suitable transition. It accompanies and characterizes so important a class of derangements—

I mean the scrofulous affections—that it appears to claim a more full consideration than can with propriety be given to it in a mere digression on the subject of colour. I must therefore, for the present, limit myself to observing, that though, in different situations, it appears to consist, in its first stage of production, of a slightly translucent deposit, it shortly acquires opacity; when it generally presents a light, and nearly white colour, which has occasionally a pale yellow or green tint. It occurs, collected into masses, varying in size from that of a millet-seed to that of a hen's egg, or larger: it also occurs in an irregularly diffused form, as we see in tuberculous infiltration of the lungs. In a crude state, it gives a white and lightish colour to the natural and pre-existing structure; but when it is collected in masses, it has generally pressed aside or occasioned the absorption of the structure in which it is deposited. When it affects the serous membranes, it appears, if abundant, to whiten them, by investing the surfaces which these membranes cover. Thus we find the pleura and peritoneum appearing as if they had been sprinkled with minute particles of broken-down boiled rice.

There are various white secretions, which I need do little more than enumerate.

White
secretions.

The most remarkable, as well as the most familiar instance of a white secretion, is that which, for a limited period after parturition, is produced by the female mammary glands. So familiar a fluid requires no description; and, in its natural state, rarely possesses any pathological importance. It may, however, make its appearance by a preternatural orifice, when the breast of a female, suckling, has been the subject of abscess, which has been opened. The escape of milk, in such cases, greatly retards the closure of the orifice: hence the importance of distinguishing this irregular discharge of milk from the purulent secretion resulting from the inflammation of the part. The whiteness of milk appears, on microscopic examination, to depend on

Milk.

the suspension of an infinite number of globules of extremely small but very irregular size, and totally differing from the particles of blood with which they have been confounded. Sometimes the lactiferous tubes are distended so as to form tumors, in consequence of the accumulation of the solid parts of the milk. This inspissated secretion, like the milk itself, is of a white colour, and presents the appearance and, to a considerable degree, the chemical character of cream cheese.

White secretions of serous and mucous membranes.

The secretions from some of the serous membranes, under some forms of inflammation, are whitened by the suspension of myriads of minute flocculent particles of opaque, coagulated, but non-plastic lymph; which has led to the mistaken notion of milk having been actually transferred from the mamma to the cavities of these membranes. The secretions of some of the mucous membranes sometimes lose their natural degree of transparency, and present an appearance bearing a close resemblance to thick milk, or paste. This perhaps is more particularly the case in the jejunum, and commencement of the ileum, than in any other situation. This character of the mucous secretion ought always to arrest the attention of those who are engaged in examining mucous canals for the purpose of investigating their diseases, since it may be regarded as a certain token that the membrane producing it has not been in a healthy state: but, though it is often a consequence of inflammation, it is very questionable, whether it be always dependent on that state. Mucus, of the character of which I have been speaking, occurs in the part of the alimentary canal which I have mentioned, in conjunction with the presence of various intestinal worms. Though the presence of these animals may have proved a source of irritation to the membrane, and disturbance to its secretion, yet the proofs of decided inflammation are not always present.

White secretion in the Fallopian tubes.

The secretion of the mucous membrane is seen of an opaque white colour and viscid consistence in the Fallopian tubes, in

cases in which there can be little doubt that the membrane lining them has been acutely inflamed; since it is not only highly injected, but sensibly thickened, especially towards the *morsus diaboli*, where the *fimbriæ* become quite turgid. This white secretion is not however to be confounded with a white secretion of a different character, by which these tubes are sometimes prodigiously distended, and of which I shall presently have to speak. The mucous membrane of the uterus appears, at times, to be the source of a similar white and viscid secretion; and though it does not seem to be connected with a high degree of inflammation of that organ, yet it evidences a degree of irritation in it, which is possessed of more importance than is generally ascribed to it. The most valuable practical observations respecting it are unquestionably those which have been offered by my friend Dr. Addison, in his essay on uterine irritation.

What is the nature of the secretion from the mucous membrane of the bowels in that species of diarrhœa called *lientery*, and which, from its whiteness, has been supposed to be chyle, I am unable to say; but we have lately heard much of an abundant secretion from this membrane, more nearly resembling rice-water than milk, but which, nevertheless, has been imagined to consist, in part at least, of chyle. Without here attempting a refutation of such an opinion, which I believe to be wholly inadmissible, I may observe, that I believe it to be the result of an extensive and high degree of irritation, which, by greatly increasing the quantity as well as modifying the composition of the secreted fluid, prevents its elaboration into mucus. A somewhat analogous example is seen in ordinary *catarrh*, when the mucous membrane of the head is affected: the irritation, however, being much greater, a portion of coagulable lymph, as well as the more fluid principles, are exhaled, and, by their intermixture in the form of small particles, occasion the turbidity, not to say whiteness, of the secretion in question. The degree of this, as well as its

Rice-water
evacuations.

chemical properties, must necessarily be liable to considerable variations.

White secretion from the pulmonary mucous membrane.

The mucous membrane of the air-passages, though it seldom affords a white sputum, is nevertheless liable to be loaded with a white viscid secretion, which variously modifies the appearance of the lungs, according to its situation. When occupying the ramifications of the bronchi, it obstructs them, renders them turgid, and gives to a section of the lung an appearance of presenting numerous cells, filled with a light-coloured purulent secretion. If this secretion is not continued to the extremities of the tubes, so as to fill the cells, the substance of the lung is often pale and doughy: but if it do extend to the termination, the cells are filled with this secretion: the part of the lung affected is consequently distended, and presents a white colour, a greatly increased specific gravity, and a considerable degree of solidity: it, in fact, constitutes that form of white hepatization which I believe to be white from the commencement, and therefore to be distinguished from that form of light-coloured hepatization, or consolidation, to which I alluded in the earlier part of these remarks. The form of which I am at present speaking, is the best illustration and confirmation of the views of those pathologists who adopt the opinion, that the product of inflammation in pneumonia is chiefly situated in the cavities into which the air is admitted, rather than between them;—an idea to which Laennec, Rostan, and Andral, have in some degree inclined, but on which my friend Dr. Addison has particularly insisted.

White secretion allied to tubercle.

There is another instance of white secretion closely allied to that which I have mentioned, as occupying the cells and minute bronchial tubes of the lungs; which has been carefully pointed out by Dr. Carswell. It seems to be nearly or quite identical with tuberculous matter, on the production of which it throws some important light. Its most striking occurrence is in the Fallopian tubes; which in

young subjects are, not very rarely, plugged up, and distended, by this firm, nearly white, friable substance. Chronic peritonitis appears to be the principal, if not the sole exciting cause of the chronic inflammatory state of the lining membrane of the Fallopian tube which produces this secretion. I have known this material to distend the Fallopian tube to the size of one's finger: and there seems to be every reason to believe that this state of the tubes, which must permanently interfere with their function, is one of the causes of obstinate and even fatal amenorrhœa and chlorosis. It is well known, that a large portion of those children who are deaf and dumb are, for the most part, of a strumous constitution; and it has been found, in some instances—though I am inclined to think them rare—that the cause of deafness has been a deposition in the Eustachian tubes, similar to that which I have mentioned. In one instance, it has been successfully removed by means of a syringe; and a certain degree of hearing has been obtained.

It not very uncommonly happens, when an ureter has been to a great degree obstructed, that the pelvis and infundibula of the kidney are distended by a substance resembling whiting and water, whilst the glandular part is more or less extensively absorbed. The nature of this pathological appearance is certainly somewhat allied to the derangement of the Fallopian tubes already mentioned; yet I think that the resemblance is not quite so great as my friend Dr. Carswell is inclined to consider it, for I can hardly regard this white secretion as tuberculous matter. Though in part derived, like the contents of the obstructed Fallopian tubes, from the secretion of the membrane which contains it, I think there can be no doubt that it is in a great degree derived from the urine in an unhealthy state, and charged with ammoniacal and earthy salts.

White secretion in the pelvis of the kidney.

LECTURE XII.

ON MALIGNANT DISEASE.

CIRRHOSIS.—DESCRIPTION OF THIS DISEASE BY BECLARD—DISTINCTION OF CIRRHOSIS FROM NON-MALIGNANT STATES—PARTS IN WHICH CIRRHOSIS HAS BEEN OBSERVED—IDENTITY OF CIRRHOSIS WITH FUNGOID DISEASE—MELANOSIS—BLACK COLOUR IN MELANOSIS—OPINIONS OF DIFFERENT AUTHORS CONCERNING MELANOSIS—TRUE MELANOSIS IS ALWAYS CYSTIFORM—DESCRIPTION AND PROGRESS OF MELANOSIS IN THE HORSE—VASCULAR SYSTEM OF MELANOTIC GROWTHS—CHEMICAL ANALYSIS OF THE BLACK MATTER OF MELANOSIS—MELANOTIC DIATHESIS—PROMINENT POINTS FOR CONSIDERATION IN THIS DISEASE—NOTICE OF A FLESHY FORM OF MALIGNANT TUMOR—HISTORICAL SKETCH OF THE OPINIONS BROACHED CONCERNING THE ORIGIN OF MALIGNANT DISEASE—OPINIONS OF HIPPOCRATES, AMBROSE PARÉ, PETIT, SOEMMERING, AND OTHERS, WHO HAVE ADVOCATED A LYMPHATIC ORIGIN; CRAWFORD; B. BELL; POUTEAU, &c.—OPINIONS HELD IN FRANCE—DOCTRINES TAUGHT BY BROUSSAIS AND THE DICTIONNAIRE DE MÉDECINE, AND STRICTURES ON THESE DOCTRINES—STATEMENT AND EXAMINATION OF THE VIEWS OF LOBSTEIN—OPINIONS OF DR. CARSWELL, AND COMMENTS THEREUPON—VIEWS OF THOSE WHO ADVOCATE THE HYDATID CHARACTER OF MALIGNANT GROWTHS; AS, ADAMS, BARON, AND CARMICHAEL.—STATEMENT OF THE VIEWS OF THE AUTHOR, AND ARGUMENTS IN THEIR SUPPORT.

GENTLEMEN,

HAVING concluded the remarks which I have thought it desirable to offer respecting colour in connection with the animal tissues and secretions, and more especially in reference to their pathological state, I now proceed to speak of those forms of malignant disease which have obtained a separate attention in consequence of their colour.

Cirrhosis.

I shall commence with cirrhosis; not because it is the most important, but because, if the view which I take of this adventitious structure be correct, it bears the closest relation to those which I have already described; so much so, in fact, as scarcely to require separation from fungoid disease, of which it seems to be a variety.

Cirrhosis is thus described in Beclard's General Ana-

tomy. "Cirrhosis, or the yellow morbid tissue, is sometimes found in masses, and sometimes in the form of layer or cyst. When in masses, this structure is yellow, compact, flaccid, moist, and bears some resemblance to the tissue of which the supra-renal capsules are composed. It has no distinct fibres. The masses vary in size, from that of a grain of millet, to that of a cherry-stone. They are sometimes almost innumerable. Those of the largest size appear to be lamellar. The tissue softens down into a grumous mass of a greenish brown colour. The effects which it produces, local as well as general, are by no means strongly marked. It often exists, in considerable abundance, in the liver; which is then diminished in volume, puckered and roughened. It is also occasionally seen in the kidney, the prostate, the epididymis, the ovary, and the thyroid."

Characters
of cirrhosis,
by Beclard.

This description I believe to have been taken from notes of Laennec's Lectures; and I must confess that I am at a loss to decide, with any certainty, as to the precise morbid structure which Laennec had in view. Andral, in speaking of the acini of the liver in a state of hypertrophy, says: "These little bodies, resembling grains of yellow wax, were regarded by Laennec as an accidental tissue, altogether adventitious, like an hydatid. This tissue he called 'cirrhosis,' on account of its colour." Now, though it must be admitted that the description of this structure, which I have quoted from Beclard, seems to belong tolerably accurately to that state of the liver which is met with in cachectic subjects, but principally in those who have been injured by excess of mercury, and in which the acini may be picked out in defined particles of various sizes; yet I can scarcely believe it possible that so accurate an observer as Laennec could have been led to regard this appearance alone as sufficient ground for establishing a distinct variety of malignant disease. From the much greater liability to this disease which is ascribed to the liver, it seems highly probable that more than one derangement of structure

Comments
on Beclard's
description.

Hepatic
lesions
confounded
with cir-
rhosis.

coloured by the bile may have been confounded with the yellow malignant disease now under consideration. Besides the altered condition of the acini, such as is met with in persons injured by the excessive use of mercury, I have seen a diseased state of the liver which consisted in a derangement of its original structure rather than in the production of an adventitious tissue, and in which, though the whole organ was altered, it was not uniformly so. Some parts presented a compact close texture, which might be almost compared to cheese. The liver in this case was remarkably yellow, having almost a citron colour. This pathological appearance might be by some regarded as cirrhosis. The coarsely granular state of the liver so frequently induced by the use of spirits may also be unusually coloured by diffused bile, and be taken for cirrhosis. This, however, is liable to the same objection as the before-mentioned cases.

True
cirrhosis.

Making every deduction of these and similar instances, there will, I believe, still remain examples of accidental tissues, which present partially a yellow colour, and are of a malignant character: to these the name 'cirrhosis' should, I conceive, be restricted. I have seen this in tumors decidedly encysted, and exhibiting the mode of formation which I have pointed out. I have seen it accompanying fungoid tubercles in the liver; in which, nevertheless, it did not appear to depend on the colouring matter of the bile, as it occupied a position at or towards the centre of the tubercle, where it appeared that the process of breaking down was about to commence. I have seen it more than once in the kidneys, in cases of prodigious enlargement of the organ from fungoid disease. Here the yellow colour was fixed in the oldest and most deeply-seated parts of the tumor. I have seen it, under similar circumstances, in the supra-renal capsules and in the ovary. I have observed the same thing in a large and old fungoid tumor nearly filling the pelvis, and growing from the ligamentous structure covering part of the sacrum; and also in a numerous collection of

fungoid tumors continued along the course of the aorta, the greater number of which were of an unusually pure white. The tumors so partially coloured with yellow generally, if not invariably, present, in some parts, a dead white; which strikingly contrasts with the variable degree of translucence belonging to such adventitious tissues in their recently-formed and more vital state.

If you now call to mind the cases in which the yellow pigment is produced, apparently from the colouring matter of the blood, and independently of any tendency to malignant disease, you will probably agree with me in the opinion, that the yellow colour is merely an accidental character attached to a particular form of fungoid disease in a particular stage of its existence, and does not entitle the tumors in which it occurs to be regarded as instances of distinct malignant disease. It is nevertheless by no means void of interest, since it points out the date of different parts of the tumor. It seems also, in conjunction with the dead opake white which often accompanies it, to indicate a state of the tumor, which, with a good enclosure of condensed cellular membrane, might remain inert and stationary for an almost indefinite period, did not the growth and progress of other parts of the tumor produce a fatal effect on the system.

Masses of fungoid growth, when they have thus acquired the yellow colour which I have described, in conjunction with the dead opake white, bear some resemblance to scrofulous or tuberculous matter in various stages: and I fully concur in the opinion which I have heard expressed by my friend C. A. Key, that it is in consequence of this appearance having been assumed by some portions of fungoid tumors, that they have been regarded as scrofulous: and it also accounts for the opinion held and taught by one or two eminent surgeons, that fungoid disease is allied to scrofula, and is apt to occur conjointly with it in the same parts; with which opinion I have not yet seen reason to unite.

I now proceed to speak of that singular affection to which

Cirrhosis is only a modification of fungoid disease.

Cirrhosis confounded with scrofula.

Melanosis.

First observers of melanosis.

the term 'melanosis' has been applied. As this is a disease of much greater rarity than the fungoid, there is less reason for surprise that it has not, till lately, attracted the especial attention of pathologists, or been regarded as a distinct disease. Like the fungoid disease, it had this degree of importance first attached to it by Laennec, who published an account of it, illustrated by cases, in the *Dictionnaire des Sciences Médicales*. It has since been treated of by Burns, Wardrop, Breschet, Cullen, Carswell, Merat, Savenko, and, more recently, in an elaborate thesis by Noack, a pupil at one of the veterinary schools in Germany.

Incidental notices of melanosis in early writers.

Although this disease had not been treated of in a separate form by any author before Laennec, conclusive evidence of its having been seen, may be gleaned, in the form of scattered remarks, amongst the writings of several of the early pathologists. Laennec himself has cited one example from Haller. Noack mentions several of those who have spoken of it; amongst whom are Morgagni, Bonetus, Highmore, and Lorry.

Melanosis not confined to man.

Melanosis is by no means confined to man. It is even more common in horses than in him: and the German author of whom I have been speaking, informs us, that it is hinted at, as one of the affections of this animal, by Celsus, and Vejetus Renatus. According to Viborgius, it has been more particularly treated of, under the name of 'Langius,' by Laurentius Rusius. It is also mentioned as occurring in the dog and the rabbit; and in some birds, as the ardea, and the leucardia.

Melanosis confounded with other appearances.

There appears to be great confusion in the mode in which the subject of melanosis has been treated. The principal source of this confusion seems to have been, that whilst some have pretty strictly confined the term to a disease marked by an adventitious heterologous deposit of a black colour and of a malignant character, others have given to the term a much more extended signification, and employed it in speaking of all cases accompanied by an irregular

and excessive production of black matter. The mere formation of this pigment, as I have already endeavoured to shew, is by no means necessarily connected with malignity. Unless in very large quantity, its presence in a particular tissue seems to be unaccompanied by any injurious general effects.

The pigment on which both the colour and the name of melanosis depend, is, with apparent accuracy, considered as the same with that which is common and natural to various parts, both in man and in other animals; and on which I made some remarks in my last Lecture. I suggested that this black matter depended on a highly venous state of the blood, induced by a prolonged stay in the veins: and Noack has expressed very nearly the same opinion.

Laennec describes the collections of melanotic matter as resembling scrofulous tubercles, scirrhus, and fungoid matter, in this, that they exist in two states; the one of *crudity*, the other of *softening* or decay. In the state of crudity, he says that melanoses are of the firmness of lymphatic glands, of a deep black colour, and of an homogeneous texture, in which there is but little humidity;—that they are opaque, and bear considerable resemblance to the absorbent glands of an adult. When this structure begins to soften, as is common to deposits of this class, a thin reddish fluid may be expressed from it, mixed with small black fragments; of which, some are tolerably firm, and others are friable. At a more advanced period of the softening process, these fragments, and, shortly after, the entire mass, become completely friable, and are presently converted into a black pultaceous substance. Laennec describes melanosis as existing under four forms: the first, in which the masses composed of the peculiar structure are enclosed in cysts: the second, in which the peculiar matter, although collected into masses, does not appear to be enclosed in cysts: the third, in which the black matter is diffused throughout the structure of the affected organ; and the fourth, in which the black matter is simply deposited on the surface of a part.

Black
colour of
melanosis.

Opinions
of Laennec
on mel-
anosis.

Opinions of
Merat,
Breschet,
Noack,

Merat divides melanosis into: 1. The tuberculous; 2. The membranaceous; and, 3. The liquid forms. Breschet divides it into the encysted and the non-encysted. Noack, whose descriptions are drawn from the appearances presented in the inferior animals as well as in man, divides melanosis into the *external* and the *internal*; and then employs the subdivisions of Merat, to which he adds the open or ulcerated form. Another form has been described by Dr. Savenko of Petersburg, but it appears to be merely a complication of cancer, or fungus, with melanosis. I apprehend that some of these forms ought, for the reasons which I have already given, to be detached from the class of structures with which I am at present engaged.

Savenko.

The encysted is the only form of true melanosis.

All the authors who have had an opportunity of becoming acquainted with the disease, agree in describing an encysted form, which I conceive strictly to belong to our present subject. Laennec describes the cysts observed in this form as of a regularly rounded figure; and varying in size, from that of a filbert to that of a walnut. They are of uniform but inconsiderable thickness, and bear a near resemblance to cellular membrane. Their internal surface is smooth, but adheres slightly to the matter contained. The bond of this union, in some cases, appears to be a fine cellular membrane; which I imagine may have been the result of accidental adhesions between the surfaces of the reflected membrane. Cullen and Carswell notice the formation of adventitious cellular membrane in which the pigment is deposited; and state, that it may be detached from the membrane beneath. Laennec says, that he has only found the encysted form in the substance of the lungs and liver; but this form has been observed in a great variety of situations by other authors.

Description of melanotic cysts in the horse.

In the horse, these cysts appear to be most frequently met with under the skin, especially about the anus and genitals; parts in which it will be observed that the existence of black matter is common, even when the animal is grey or nearly white. In these animals they are apt to form masses of

large size. Gohier mentions one which weighed thirty-six pounds. Sometimes they are branching and pedunculated: at other times they are attached by broader bases. They present several varieties in colour: some are jet black; others only blackish or brown; and some are mottled with black and white. There is likewise a difference in the external surface of these cutaneous melanotic tubercles. Sometimes they are smooth and polished; sometimes they are rough and warty; at other times they are covered with a separable horny crust, which is probably nothing more than the dried exudation or discharge. Their common figure is round, ovoid, or reniform. They appear, in general, to be attended with but little pain, except when inflammation is set up in the surrounding structure. Cracks and slight ulcerations are formed, and increased, by the movements to which the parts about the tail are liable. These spots pour out a black or dark-coloured secretion; which in some instances is mixed with pus formed by the surrounding parts. Notwithstanding that Breschet has asserted the contrary, this fluid is often highly offensive. Sometimes the ulcerated part exhibits a tendency to rapid cicatrization, which gives rise to the formation of an indurated mass: the wound, however, speedily re-opens, and again pours out an effusion of dark fluid. Occasionally, the tubercles remain nearly stationary, in an open ulcerated state, for a great length of time; but are deepest and longest during the summer season. At other times, the disease spreads rapidly to the surrounding parts; and, suppuration and gangrene taking place, the animal falls into a state of marasmus, and dies, or is destroyed on account of the offensive odour which attends him.

Although, in horses, the parts around the anus and genitals are the most frequently affected with disease, it also occurs about the mouth. It attacks those parts which are well covered with hair, as well as those which are nearly bald. It is said to be not unfrequent near the scapula, and,

Progress of
melanosis
in the horse.

Parts of the
horse most
liable to
melanosis.

in short, wherever the cellular membrane is loose. This remark respecting the vicinity of the scapula, which is made by Noack, has been repeated to me by English knackers; and I observed the fact in one melanotic horse which I have examined.

When the melanotic tubercles are situated in parts abounding in loose cellular membrane, they are always rounded; but when subjected to pressure, they are modified by this cause. By Laennec, Breschet, and many others, the envelops of the melanotic tubercles are regarded as cysts; but Noack, notwithstanding that he admits their pedunculated form, considers these as nothing more than condensed and modified cellular membrane. In this, I am persuaded that he is mistaken. In those cases in which masses of melanotic matter are stated to have been formed without any appearances of cyst, I suspect that the cysts must have been overlooked, from causes similar to those which I mentioned when speaking of the form of fungoid disease in which the presence of cysts is very indistinct.

Lesion of
structures
adjacent to
melanotic
structures.

The surrounding structures are stated to be often found unchanged in the neighbourhood of melanotic formations; but in other instances they are considerably contaminated by it. Sometimes the muscular and tendinous fibres appear to be cut off in the melanotic mass: at other times they are pushed aside by it. Flandrin and Noack agree in stating, that in both these cases neither the muscular nor tendinous structures are contaminated by the disease. The bones and neurilema are said to be blackened, but not to be otherwise affected.

Vascular
system of
melanotic
formations.

The melanotic mass is said to be incapable of being injected. Noack says, that the vessels going towards the morbid growth terminate by open mouths on the interior of the cysts; and that the injection, whether thrown into the arteries or veins, which are very numerous in the cysts, becomes extravasated and dispersed through the black matter. He makes at the same time the following remark; which I

consider as affording some confirmation to the opinion which I have offered respecting the causes which operate in the production of the black matter. He says, that he has often observed that the veins predominate;—that he has found them distended, and spread over the tumor, in the form of a web. He has likewise observed these vessels filled by a black matter, similar to that composing the bulk of the tumor. Breschet has likewise observed the presence of black matter in the vessels of the cysts; but, according to Noack, he has mistaken the veins for arteries. Noack considers the black matter as a secretion from the veins. His own expression is, “*Venarum præsertim viâ excerni mihi videtur.*” It has been also remarked, that melanosis is promoted by old age; in which the venous character of the blood predominates.

The black matter of melanosis has been repeatedly subjected to chemical analysis. Socquet states, that the colouring matter is insoluble in alcohol; and that it consists of carbon dissolved in some animal fluid, from which it cannot be separated by any known chemical process. Hurtrel d’Arboval gives as its constituents, phosphate of lime, a portion of iron, and a black matter insoluble in alcohol. Lassaigne, from the analysis of a specimen of melanosis taken from a horse, gives: 1. A coloured fibrous matter. 2. A blackish colouring matter, soluble in dilute sulphuric acid, and also in a solution of subcarbonate of soda, to which it gives a tinge of red. 3. A small quantity of albumen. 4. Muriate and subcarbonate of soda, phosphate of lime, and oxide of iron. According to Barruel and Breschet, it bears a great resemblance to the black pigment of the eye, as analyzed by Berzelius.

Chemical
analysis of
the black
matter of
melanosis.

In horses, the disease appears to be both a constitutional and an hereditary affection. It has been observed to affect the colts of a particular sire, generally shewing itself about the second or third year. White and grey horses are most liable to it; whilst the roan and the sorrel appear

to be exempt from it, unless descended from a white parent. A similar remark may be made with respect to man; since those individuals who are of the melancholic temperament are said to be most liable to melanosis. This predisposition, then, appears to concur with the predominance of the venous system, and affords some further confirmation of the opinion which I have offered respecting the production of black matter. The melanotic diathesis may, as I believe, be nevertheless acquired by disease in individuals of every temperament; although, for the reasons which I have just advanced, it must be more readily produced in some than in others. The sudden suppression of menstruation has been given amongst the exciting causes. Warm climates appear to be more favourable to the developement of the disease than the colder. I believe that, in some cases, the production of this disease is favoured by a state of the body closely allied to scorbutus, if not identical with it: and I am the more inclined to admit this supposition, which was first suggested to me by the examination of preparations and published cases, from the circumstance of its having still more strongly suggested itself to my friend Bransby Cooper, by a case which fell under his observation in Edinburgh; in which the patient, who was affected with melanosis of the eye, and some other parts of the body, presented a scorbutic state of constitution in so marked a manner, that every slight external violence produced ecchymosis, which in some instances proved the commencement of melanotic tubercles.

I feel some difficulty in urging an opinion respecting a disease of which I know so little, from personal inspection, as I do of melanosis: but I think the concurrent testimony of most authors, as well as the facts which I have been able to observe for myself, shew that there are two points to consider in melanotic formations. The most obvious, and consequently that which has attracted the most attention, is the production of the black pigment. This, however, is the

Two things
notable in
melanosis;

least formidable part of the complaint; since, as we continually see in lungs loaded with black pulmonary matter, no very serious evils appear to result from its presence. The other circumstance is the production of a new growth, more or less distinctly possessing the anatomical characters which mark a whole class of adventitious deposits, amongst which I have placed true melanosis. It is this which appears to be connected with the fatal constitutional taint.

1. black
matter;

2. fungoid
growth.

The important question here suggests itself—Is the malignant disease, in which these two characters are combined, properly regarded as a distinct species of disease? or is it rather the result of the accidental combination of true scirrhus or fungoid disease, with the tendency to the production of black matter which is known also to combine itself with ordinary inflammation? Some cases are so strongly marked by the production of similar melanotic tumors in various parts of the body, that convenience, if not strict pathological propriety, will warrant us in forming them into a group by themselves. Others, and perhaps the more numerous, at least in man, present a manifest combination of the encephaloid tumor with the black pigment.

Before I quit the description of the varieties of malignant diseases, I must notice a form, which with more propriety would have been introduced into a former Lecture, seeing that its peculiarity depends rather on its structure than its colour. The variety to which I am referring may affect both internal and external parts. The best specimen which I have seen, grew from the neighbourhood of the scapula, where it seemed to be connected with tendinous structure. Other specimens were connected with the peritoneum. The most striking peculiarity of this form of adventitious structure, which I believe to be one of the many varieties of fungoid disease, consists in the peculiar obscurity of the encysted structure, which, nevertheless, essentially exists in it. The tumors, which are of various sizes, present a remarkably smooth and rounded surface;

Notice of a
firm fleshy
form of
malignant
disease.

and in some cases they are attached by a very small peduncle. The smoothness and rotundity of these tubercles depend on the absence of that irregular distension which takes place in most other tumors of this class, and is occasioned by the unequal growth of the subordinate encysted parts of the tumor, by which a kind of hernial protuberance is often produced. If we make a section through one of the smooth rounded tumors of which I have been speaking, the structure appears, in many instances, nearly or quite uniform. It often seems well supplied with blood, and has a kind of parenchymatous structure, not very dissimilar to that of the kidneys or the spleen of a fowl; and I have not in this state seen them shew any disposition to soften or ulcerate. We might easily take up the idea, that each individual tumor consists of a single cyst, the solid contents of which are capable of becoming well organized and permanent, did we not in some instances find unequivocal traces of that structure to which I have so often referred. The traces of it are particularly obscure in the first-formed tumors; and they become increasingly evident in those of later formation, which likewise exhibit other changes in texture, by which they insensibly approach to the more ordinary character of fungoid disease. Sometimes the compound character of the mass of the tumor is made up of subordinate encysted portions; as is rendered evident by a difference in colour, one part being more injected than another, and perhaps approaching to the melanotic character. Sometimes a little exploration with the handle of a scalpel will enable us to detect parts in which ready separation of the cysts may be made; and we then find that a smooth well-encysted portion is enclosed, not by a thin reflected membrane, but by the solid parenchymatous structure of the neighbouring part of the tumor, which seems to stand to it in the relation of a reflected membrane. I have had but few opportunities of seeing tumors of this description; but they appear to be of sufficient interest to merit

especial notice : they likewise serve to illustrate the great variety in which the encysted character may be met with.

I have now endeavoured to throw before you the anatomical peculiarities of a large class of adventitious productions ; amongst which are found some of the most formidable maladies to which the human frame is incident. This, I trust, will be admitted as a sufficient apology for my having so long dwelt upon one subject. If some of the points, on which I have the most insisted, have not seemed to direct you to any practical conclusions, I would wish you, first, to recollect, that the consideration of the curative means does not fall within my province ; and, secondly, that an accurate knowledge of the nature of a disease is not to be rejected as useless, because it does not directly suggest an infallible mode of treatment. It may, at least, direct our exertions for the discovery or invention of more successful methods ; and in the mean time improve our diagnosis ; which, when correct, is at all times honourable ; and, though it may lead to the unerring prediction of a melancholy event, must nevertheless, in the retrospect, afford satisfaction to the friends of the patient.

Although I have described to you the anatomical peculiarities of malignant tumors, and other structures closely allied to them, with a degree of confidence founded on observations, multiplied until they have produced conviction in my own mind, it will be right that I should not let you go away with the idea that the doctrine which I have advanced on this subject is that which has been universally promulgated and received. I shall, therefore, before I conclude, bring into brief review the principal opinions which have been advanced on this subject.

Hippocrates having observed that women of a dejected and melancholy cast, and who labour under difficult menstruation, were frequently affected with cancer, thought that the cause of this malady was to be found in Atrabilis ; or a corrupting leaven fermenting in the humours. Galen,

Theories of
the nature
of malignant
disease :—

Theory of
Hippocra-
tes ;

Celsus, Aretæus, and most of the ancients, adopted these views of the Father of Medicine, and contented themselves with developing his ideas. Even Lieutaud considered that a melancholic humour was a frequent cause of cancer in women of from forty-five to fifty years of age.

of Ambrose
Paré ;

Ambrose Paré attributed cancer to a malignant eating humour, whose action he compared to that of a crab. Perhaps the nature of the accompanying pain may have had some share in giving rise to the name of cancer. According to some authors, it is rather on account of the phagedenic ulcers by which we see the tissues destroyed, and as it were successively devoured, that the name of cancer has been given ; whilst others assert, that it is from an imagined resemblance between the afore-mentioned animal, and the enlarged veins about a malignant tumor, that the appellation has been bestowed.

of
La Peroné,
Petit, &c. ;

La Peroné, Petit, and Quesnay, have pretended, that in cancer the lymph is thickened, and converted into a sanious eating humour. Pelletan has also considered cancer as resulting from the thickening and concretion of lymph in the affected part. Since the discovery of the lymphatic vessels, many diseases have been vaguely attributed to morbid alterations in the lymph. It is not very easy to determine what was intended to be implied by this term. We are still too much in ignorance both of the lymphatic vessels themselves, and of the properties of the fluids which they contain, to warrant us in forming a pathological theory founded upon them. Perhaps, as the authors of the *Dictionnaire de Médecine* have very candidly observed, we should be more accurate, and at the same time more just to our predecessors, if we allowed their remarks, with respect to the lymphatics, to be considered as referring to the capillary vessels in general. Both Sæmmering and Le Dran have advocated the lymphatic origin of cancer : the latter believed that a morbid state of the lymph is capable of producing cancer, independently of any local causes, such as

of Sæm-
mering and
Le Dran ;

blows or falls; and independently of the constitutional causes, such as the suspension of menstruation. Vigaroux likewise refers to the lymph as the essential cause of cancer; but he contends for the necessity of some precursory cause, capable of interfering with the progressive motion of the lymph. Chopart and Desault also adopted the idea of a stagnation of the lymph, but thought that this was occasioned either by the irritation or the atony of the solid parts induced by external violence.

Crawford considered that the production of cancer was accompanied by the production of a gas analogous to sulphuretted hydrogen. He thought that this gas became united to ammonia; and he compares the formation of cancer to alterations dependent on putrefaction. He has observed, that the secretion from a cancerous ulcer is generally very fluid; that it is not always of the same nature; but that it varies according to the remedies employed internally and externally, and according to the aliments made use of by the patient. By many, this secretion has been supposed to be so irritating as to excite ulceration in parts to which it is applied. It does not however appear to possess any contagious properties; both Alibert and Bielt having inoculated themselves with it, without the slightest effect of the kind. The former has likewise introduced it into the stomach of dogs; and Dupuytren gave them portions of cancerous tumors, with the like result.

Peyrelhe denied the existence of a primitive diathesis; but attributed the disease to humours spontaneously extravasated in glandular swellings, and converted by putrefaction into an acrid and corrosive ichor. Benjamin Bell scouts the idea of the presence of an acrid principle; and regards the external accidents as competent to produce the disease, and as adequate to cause the formation of a fluid as acrid as that of cancer. By way of proof, he adduces the example of ulcers which accidentally assume a bad character, and secrete an acrid fluid which cannot be admitted to have existed primitively in the blood.

of Pouteau.

According to Pouteau, an accidental violence done to the tissues, producing a solution of their continuity, is the primary cause of the disease. "A blow," says he, "received on a delicate part, like the breast, occasions, besides acute pain, the rupture of a greater or less number of small vessels, which gives rise to the escape of the blood and other fluids which they contain: hence the livid discoloration which accompanies bruises. The extravasated blood is dissolved, becomes acrid, and irritates the nervous fibres about which it is effused; and a tumor is produced, which is at first small, but by time acquires increased size and hardness."

In the order of time, I might next direct your attention to the opinions of Adams and R. Carmichael; but I reserve the consideration of them till I come to speak of the closely-allied doctrines of Dr. Baron.

Opinions
held in
France—

that malignant tumors
are entirely
new
growths—

that they
are degenerations of
natural
tissues.

In France, where pathological anatomy has been cultivated with a degree of ardour which has been surpassed by none of her neighbours, the received doctrines with respect to adventitious or accidental tissues, of which those now under consideration are the most important, are divided into two classes. According to the first, these structures are altogether new, and produced by a sort of epigenesis. The distinguished names of Laennec and Beclard are numbered amongst those of its advocates. The opinions of John Hunter and of Abernethy are in conformity to those of this class. According to the second class, amongst the supporters of which I must mention Dupuytren and Cruveilhier, the accidental tissues are nothing more than the result of the transformation of natural tissues. In the phraseology of this sect, the heterologue adventitious structures are styled 'degenerations.' The doctrines of Broussais, which have with so much avidity been imbibed by great numbers of the younger members of the medical profession in France, have contributed powerfully to increase the number of adherents to the last-mentioned sect. Irritation, and its consequent inflammation, being the almost

exclusive and universal agents; according to the creed of the abettors of the *soi-disant* physiological doctrine, every morbid alteration of structure is by them attributed to these causes; whilst those differences, against which they cannot close their eyes, are explained, by referring them to the different proportions in which the elements of the blood, under different degrees of irritation, are effused into the tissues whose engorgement they effect. All inflammations and subacute inflammations, observes Broussais, are capable of producing cancer; and its progress is always in the ratio of the existing inflammation. External cancer, the product of the irritative degeneration of the tissues in which albumen and fat predominate, is always accompanied by inflammation. Cancer is not incurable, so long as it is only local. According to this author, the inflammation of the external cancer is repeated by sympathy in the principal viscera: cancer is only developed in them as a consequence of this inflammation. It may, however, not be set up; since the cancerous diathesis is not so general as it has been said to be.

Opinions of
Broussais
and his dis-
ciples.

The learned authors of the *Dictionnaire de Médecine*, in their article "Cancer"—to which I am indebted for a considerable portion of the materials of this historical sketch—appear to entertain opinions very similar to those which I have last quoted. The paragraph which I am going to cite, I believe to be from the pen of Breschet. "According to us," says the author in question—"and our opinion is founded on the examination and dissection of a great number of cancers in every tissue—the structure, function, and position of organs may indeed influence their relative or comparative liability to cancerous affections; but we may venture to affirm, that no tissue is exempt from this alteration, even as no tissue is exempt from inflammation. Every structure may become the seat of cancer, either primitively or secondarily. The distinction established, by some pathologists, of primitive organic alteration in some

Opinions of
Breschet.

systems, and secondary in other systems of organs, is altogether false with reference to cancer. We consider cancer as always succeeding to an irritation, or inflammation; and incapable of being developed, unless one of these two states have preceded it. Suppose some irritating cause to act with a moderate force on the more or less extended surface of an organ—what follows? There will be an increased activity of the vitality of the part: the blood will arrive in larger quantities by its vessels: the net-work of capillaries is distended: the exhalant vessels allow a coagulable fluid to escape into the cells of the tissue. If the engorgement is inconsiderable, and proper treatment be employed, the afflux of the humour soon ceases, the local congestion disappears, and the coagulable matter is taken up by the absorbents. In the opposite case, in which the engorgement goes on increasing, there is an increase of nutrition in the surrounding parts; and an exhalation, similar to that by which false membranes are formed, at the point at which the irritation is the greatest. This first degree, accompanied by a sub-inflammatory state, may be either entirely dissipated, or only disappear imperfectly: in which latter case, there remains a nucleus of induration. Of this nature are the small tumors which we observe in glands; and particularly in the mammæ, after they have received some slight external violence. The affection is essentially local, and is unaccompanied by any sympathetic effect. If the irritating cause be removed, the product of effusion still remains; and on its absorption, or non-absorption, will depend either the termination of the affection, or the persistance of a nucleus which hereafter may lead to the most serious effects. If, in consequence of an increase of nutrition in the affected part—or if, in consequence of some external cause, which is the more frequent case—inflammation be set up in the part, it is in a condition unfavourable for resolution, or the production of healthy pus. The parts, in consequence, soon become disorganized.

When the affected structure is near the surface, ulceration soon takes place, and by degrees quickly destroys the whole of the indurated portion; but when the effusion has been deeply seated, the passage to the state of disorganization proceeds, and the *débris* of the indurated mass form a deposit, having the characters of what is called cerebriiform matter. When blood happens to be effused and mixed with the *débris*, or when fungous granulations arise from points at which an albuminous fluid has been exhaled, and become imperfectly organized by the production of small vessels, such as are formed in false membranes and fungating ulcers, the name of fungus hæmatodes is applied. In these successive states we see all the peculiarities which mark mere induration, scirrhus, and cancer, as well as all the varieties of cancer; such as, carcinoma, fungus hæmatodes, and encephaloid tumors; for these alterations and degenerations all proceed from a pre-existing inflammation. When a too great activity of nutrition takes place at the affected part, the tumor increases, either by the continued effusion of the coagulable or plastic lymph of the English Authors, or by the production of a fatty mass, sometimes yellow and firm, sometimes white, and nearly fluid. When almost fluid, it distends the cells of the adipose membrane, and produces that sort of serous cysts which some surgeons have taken for true hydatids. In our opinion, scirrhus is, in its nature, identical with those indurations or callosities which accompany wounds and fistulæ. It depends, as we have said, upon a deposition of coagulable lymph, or a very coagulable albuminous fluid in the cells of the tissues; and it may be developed in all of them."

Such are the outlines of the doctrines which are taught on this subject by the Authors of the Dictionnaire de Médecine, and which are held by many of their countrymen. I confess I can by no means agree with these authors, in regarding those accidental productions, to which the term 'malignant' has been applied, as so completely similar to

Strictures
on these
opinions.

the products arising from ordinary inflammation. We are continually seeing common inflammation leading to the production of a structure possessing all the varieties of induration offered by true scirrhus, but which persists for years without inducing any of the local or constitutional effects which characterize all the forms of cancer. It is manifest, that the authors of the article in question, as well as most persons who have investigated the anatomical characters of cancer, have not unfrequently observed a cystiform structure; but, in common with most of their predecessors and contemporaries, they have regarded this circumstance as an accidental complication, and not as an essential feature.

Doctrine
taught by
Lobstein,

Lobstein, the late indefatigable Professor of Pathology at Strasbourg, rejected the Broussesian idea of the inflammatory origin of cancer; regarding it as a new and adventitious structure, the result of a deviation from the normal process of nutrition; to which he applies the term 'heteroplastic:' and, as there are other productions which are also regarded as heteroplastic, he designates cancer, and the other members of the group of malignant diseases, by the distinction of 'cacoplastic.' He gives no new or precise view of the anatomical structure of the cacoplastic tissues; but he notices the opinion of Deshayes-Gendron respecting the structure of scirrhus tumors, and appears to adopt it.

Deshayes-
Gendron.

Chemical
analysis of
scirrhus.

He has given the results of the careful chemical analysis of scirrhus tissue made by Hecht jun. They are as follows:

ANALYSIS OF A SPECIMEN OF SCIRRHOUS BREAST.

	grs.
Albumen	2
Gelatine	20
Fibrine	20
Fluid fatty matter	10
Water and loss	20
	<hr/> 72

ANALYSIS OF A SCIRRHOUS MASS FROM THE UTERUS.

Water	35
Fatty substance	10
Fibrine	10
Gelatine	15
	<hr/>
	70

Lobstein remarks the absence of saline matters in the scirrhus mass. It is obvious, however, that salts common to animal fluids and solids are not necessarily excluded from scirrhus matter; since we have seen that the scirrhus structure may become ossified, or rather petrified, by the accumulation of earthy salts.

Lobstein further differs from the Parisian pathologists with respect to the intimate relation between scirrhus and the various forms of fungus; and he very properly insists on the more rapid production of fungus, and on the superior tendency to its production in young subjects. But the occurrence of those cases in which the firmness and hardness of scirrhus are met with conjointly with the presence, in other portions of the same mass, of the softness and other characters of fungus have not led him to acknowledge the degree of relationship which I think should be admitted as existing between them. He gives to such tumors the name of 'dissimilar tumors.'

Lobstein's opinions as to the connection between scirrhus and fungus.

The most remarkable point which I have noticed in the opinions of Lobstein respecting the class of structures which we are now considering, relates to the mode in which he supposes the softening to take place. He regards this process as the result of the efforts made by nature to effect the organization of the adventitious structure: and he appeals to the fact of the evident existence of blood-vessels, in cases in which softening and ulceration have already taken place, as proofs of the truth of this view. Whilst I regard this opinion as inconsistent with the appearances exhibited by these tumors in their different stages—and with the fact, that

Lobstein's opinion as to the softening of malignant tumors.

the impaired vitality which precedes softening and decay is as unfriendly to the production of vessels in these heterologous structures as it is in the false membranes produced by the inflammation of serous membranes—I believe that the appearance of vascularity to which Lobstein has referred, is the result of irritation which the softened or decaying part excites in the neighbouring parts which still retain their life and organization. Lobstein, whose good faith I believe to have been equal to the laborious industry which he displayed both in making original observations and in acquiring the opinions and observations of others, appears to have had his attention more particularly turned to the perception of the differences than of the similarities and affinities of phenomena; and his propensity to express these differences by specific terms has had a tendency to overcharge pathological nomenclature.

Opinions
of Dr.
Carswell.

The production of malignant disease has more recently been attributed to an alteration in the nutrient fluid by an author whose views are entitled to respect and consideration, not more on account of the prominent position which he holds as Professor of Morbid Anatomy in the London University, than because of the singular assiduity and perseverance with which, for several years, he has devoted himself to the investigation and admirable delineation of the vast variety of subjects which the extensive field of Pathological Anatomy presents. One argument adduced by my friend Dr. Carswell, in support of the view which he takes, is drawn from the fact which I have already noticed, that a substance resembling that which enters into the composition of the malignant tumor itself may occasionally be found in the interior of vessels, but more particularly in the veins; though it is occasionally found in the lymphatic, and even in the arterial system. It is evident that the material so found is not *in transitu* to the spot at which the bulk of the tumor exists. Its consistence, not less than the office which the veins and absorbents perform in conveying fluid rather *from*

than *to* the part affected, strongly militates against such an idea. Is this appearance, then, to be regarded as a sufficient proof that there exists an essential and general change in the blood in the system, such as to give rise to the development of malignant tumors in one or more parts of the body? I conceive not. Whilst I am far from contending that the blood and other fluids in the system retain their natural and healthy constitution when the malignant diathesis is fully formed, I think that this change, whatever it may be, does not occupy the position assigned to it by Dr. Carswell in the series of events which occur in the production of malignant disease. We may observe, in the first place, that a tumor, possessing unequivocally the character of scirrhus or fungus, may exist in one particular part of the body only; leaving the rest of the system, for a considerable length of time, to all appearance, uncontaminated. How is it that the peccant humour confines its mischief to one spot, and performs the part of good and healthy blood everywhere else throughout the body? We frequently find, when an operation is performed for the removal of a malignant tumor, that the processes of healing and cicatrization of the wounded part proceed as regularly and favourably as possible, although the system may have been already sinking under the effects of the local disease; and, notwithstanding, that when death carries off the patient, even a short time after the effects of the operation have been recovered from, the viscera themselves are found affected, in such a manner as to leave no room to doubt that they had participated in the disease long before the performance of the operation. How is this fact to be reconciled with the theory, that the disease commences and essentially depends upon the morbid condition of the blood? I have already mentioned the fact, that when inflammation is set up in and around a tumor of malignant character, the effusion which takes place in the natural structures around the adventitious growth is apt to approach in composition to

Arguments
adduced in
opposition
to this opi-
nion.

that of the tumor : this, however, is not so much an evidence of the general deviation of the fluids from their healthy state, as of the local deviation from the healthy process of nutrition : the accompanying symptoms of inflammation attest the reality of this local change. The existence of a material in some respects resembling that of the tumor in the interior of vessels is, I believe, nothing more than one of the effects of this change. Its more frequent occurrence in veins favours this idea, since they are more disposed to inflammation than other vessels : and, as they allow of its extension along their course from the original seat of the affection, we need have no difficulty in accounting for the existence of the morbidly-produced material through a considerable extent of the vessel.

Review of
other opi-
nions of Dr.
Carswell.

There are other points in the views of Dr. Carswell regarding malignant disease, respecting which I feel myself obliged to dissent from him. He considers that the altered fluid exhibits itself in three different modes. First, as the nutrient fluid of the affected part taking the place of that which in the healthy state maintains its organization ; which substitution progressively brings about the degeneration of the tissue by an alteration of its chemical rather than of its anatomical character. He instances the production of malignant tubercles in the liver as illustrating this part of his view. It would be foreign to my present purpose to enter into the complicated anatomy, and consequently complicated pathology, of the liver, which it would be necessary to have before us for the full discussion of the subject ; yet I may remark, that I find in these cases distinct traces of the cystiform character, which Dr. Carswell believes to be absent in the malignant tubercles of this organ ; and that, although the acini appear at times to undergo degeneration, the cellular membrane accompanying the branches of vessels and ducts is the texture in which the formation of malignant tubercles in the liver commences. The Doctor considers, that, in carcinoma of the stomach, the muscular

and cellular tissues of the organ are converted, by the nutritive process of transformation, into a homogeneous mass; which is afterwards softened down, or assumes the mammary, medullary, or hæmatoid form of carcinoma.—The second mode the Doctor describes as occurring on the free surfaces of serous membranes, upon which the heterologous material is found effused, without the membranes appearing to have undergone any previous change whatever. The existence of such an effusion must be an extremely rare occurrence, since I do not remember to have ever met with it. The multitudes of tumors of various sizes and appearances, which he mentions as affecting the pleura and the peritoneum, ought, I conceive, to be considered as situated behind the serous membrane which they raise and distend. On the attached surface, something like an effused layer may be seen, but only in an advanced stage of disease; when the natural structures have become inflamed in the neighbourhood of the adventitious and encysted growth.—The Doctor's third form is that which I have already alluded to, in connection with his view of the altered character of the blood: I mean, its appearance in a separate form in the vascular system, and more especially in the veins and lymphatics. Its existence in these situations I believe to be the result of inflammation attacking the malignant adventitious growth, and the natural structures connected with it.

There is another point in the Doctor's opinions, connected with these diseases, to which I must refrain from assenting, although I have not examined any specimen expressly for the purpose of investigating the question. In speaking of those forms of malignant disease which admit of organization, the Doctor appears to consider that vessels are formed *de novo* in the adventitious structure; that these vessels become subsequently connected with the pre-existing vessels of the neighbouring parts; and that there is, consequently, a proper and a collateral circulation in these

formations. I am sceptical as to the production of new and independent vessels, except in the case of an embryo ; and I believe that in the organization of new parts, the vessels are always prolongations of those which were pre-existent. I have already treated of this question, in speaking of the organization of false membranes upon the surface of serous membranes.

With respect to an objection urged by the Doctor as to the relation existing between the heterologue substance and the cysts which I have described, a reply to it, or rather an explanation of my ideas on this subject, will be found in the speculation respecting the formation of both, which I shall venture to offer before I close this Lecture.

Writers
who have
observed
the cysti-
form struc-
ture :—

I shall now proceed to take a glance at those authors who have more particularly referred the production of the tumors of which we are treating to the developement of hydatids or cysts. Although amongst the writings of some of the oldest morbid anatomists are to be found sufficient evidence of their having noticed the presence of cysts in conjunction with malignant tumors, I shall, on the present occasion, pass them over ; since they appear, like the authors of the article in the *Dictionnaire de Médecine*, to have regarded the circumstance as accidental, and not as essential.

Hunter.

Dr. John Hunter, who practised in the West Indies, is generally referred to as the first promulgator of this doctrine : but, as far as I can judge of this author, from the few extracts from his paper which I have had the opportunity of seeing, he appears rather to have been engaged with the description of the appearances and habits of vesicular worms or true hydatids, than with the adventitious serous cysts, and the tumors dependent upon them. Dr. Baron, after quoting from Dr. Hunter a good and well-marked case of acephalocyst hydatids, makes the following remark : “ With the knowledge of all these facts, it is somewhat surprising that the ingenious author did not push them to their obvious conclusions, and expose

more decidedly to the mind of his readers that great field of pathological investigation of which we have attempted to give an outline."

Dr. Adams, who, like Dr. Baron, appears to have considered the cases related by Dr. Hunter as favourable to the idea of the hydatid origin of cancerous and other tumors, appears to have been the first to advance and develop this doctrine. He considered cancer to depend on a vesicular worm—the *hydatid carcinomatosa*. This hydatid he describes as composed of a cyst with its contained fluid. The cancerous fungi are the appendices of the animal. The granulations, for the formation of which the hydatid excites the neighbouring parts, are produced, according to Dr. Adams, to protect the living animal against the deleterious influence of the inflamed and suppurating parts surrounding it, or by neighbouring dead hydatids: hence, these fungous granulations are not present in the early stage of cancer, but are formed subsequently, investing the hydatid, and producing a tumor beneath the skin.

Dr. Adams advanced the opinion, that cancer depended on vesicular worms.

In order to account for the various appearances which are met with, he refers them to different species of hydatids—the '*lymphatica*,' the '*cruenta*,' and the '*carcinomatosa*.' He believed that these hydatids enjoy but a short period of life, but are reproduced with great rapidity.

Dr. Baron, who is generally referred to, by British and foreign pathological teachers and writers, as the advocate of the hydatid origin of pulmonary tubercles, has extended this view to the class of cancerous affections also. In this fundamental principle he agrees with Dr. Adams, from whom he strongly dissents respecting some of the details. The views of Dr. Baron are partly founded on the observations of Dr. John Hunter upon hydatids evidently of the species *acephalocystis*; and partly on the authority of his illustrious friend, the late Dr. Jenner, whose opinions and experiments he has adopted. From cases which cannot be mistaken, and from his own works, it is evident that he has considered

Similar opinions are held by Dr. Baron.

his hydatids, in one of their stages at least, as possessed of an individual life. He elsewhere ascribes their formation to the dilated extremities of absorbent vessels; and again refers the morbid appearances met with in many diseases to the loss of the hydatid character altogether, and to transformations which subsequently take place.

The parasitical origin of some of the structures which we have been considering has long been held by a distinguished surgeon in Dublin, Carmichael. He lately communicated his views on this subject to the Medical Section of the British Association, at its Meeting at Bristol. They will probably, before long, be made public. At present, I am unacquainted with them.

Richard Carmichael, who published a paper on Cancer in the Philosophical Transactions in 1809, also advocated the idea that this adventitious structure is possessed of independent life, and recommended carbonate of iron for the purpose of destroying it. Meckel and Lobstein represent Cléri, Burns, and Himly, as having victoriously combated the idea of the hydatid origin of cancer. I am not aware of the mode in which they have treated the subject; but I trust that, in the preceding Lectures, I have put you sufficiently on your guard against the sources of fallacy connected with this hypothesis, to render it needless for me to have recourse to their arguments to convince you that it is untenable.

Such are the opinions which have been commonly entertained as to the origin and mode of formation of this important class of structures. I shall occupy the remainder of the present Lecture, and close the subject, by submitting to you the views which my own observations and reflections have suggested.

The tendency to produce adventitious structures, possessing the type which I have described, is by no means confined to man: it occurs not only in different classes of the mammalia, but also in birds: whether it ever occur in cold-blooded animals, I am unprepared to state.

The general tendency to produce the arrangement which forms the striking characteristic of this whole family of adventitious structures, and their relationship in this particular, however much they may vary in colour, texture, size, figure, and position, appear to indicate that there must be some general cause operating in their production. Whether we succeed in discovering it or not, we may regard it as an object worthy of investigation; since, as these structures exhibit formation and nutrition in their simplest mode, they offer us the most favourable opportunities for commencing the investigation of those operations.

There is one practical advantage which may be derived from the consideration of the malignant heterologue formations in connection with the structural characters which I have pointed out, which I will take the liberty of suggesting. It will, I think, be readily admitted, that in reading the works even of the best surgical authors who have given us the history of cases in which these diseases have been concerned, it is extremely difficult to determine the precise character of the tumors which they had in view. This is a difficulty which greatly deteriorates the value of their cases, by precluding the possibility of drawing inferences as to the comparative frequency—tendency to increase locally or by the contamination of the system—chances of success from operation—and other important points which might be hoped for from the assemblage of such cases. Now I cannot but flatter myself, that a careful attention to the structure of these tumors, on the principles which I have pointed out, would lead to such an analysis, and appreciation of the appearances presented to view, that both description and recognition would be greatly facilitated.

There was certainly some plausibility in the opinions of the older pathologists, in referring to the lymph or nutrient fluid, the very striking deviation from natural tissues, not only as to form, but as to substance or material also.

I have no facts to warrant an opinion, whether the devia-

On the origin of adventitious growths.

tion from the healthy state exists previously in the nutrient fluid, or in the vessels which contain it. The functions of both, in their inseparable relations, appear to be disturbed. The following, as I am induced to believe, from the effects which are within our observation, appears to be the kind of operation which takes place. I advance it, not without diffidence, and merely as a conjecture or hypothesis, which, whilst it seems to possess the conditions required, will serve to render more intelligible the views which I have detailed.

They do not
originate in
extravasa-
ted blood.

It is admitted, on all hands, that a local injury is a very frequent exciting cause of the production of the adventitious growths in question. Hence arises the idea entertained by some, that a little blood extravasated into the cells of the cellular membrane becomes the first rudiment of the new structure. The correctness of this I am disposed to dispute; because we find a similar kind of material, and a similar reference to the same type of formation, in the different parts of the same tumor. Now, as to the formation of the parts of the tumor superadded to the nucleus, or that first formed, we are certain that it is not occasioned by extravasation of blood, though such an occurrence may take place as a mere complication. We ought therefore, I conceive, to look to some other cause for the production of the first portion.

Hints
drawn from
the granu-
lations of a
common
ulcer.

I conceive that the formation of a healthy granulation, such as nature employs in the reparation of an ordinary wound or ulcer, may afford us some clue which may lead to the solution of the present inquiry. These granulations, when luxuriant, and exhibiting themselves on a large scale, present a nearly smooth and rounded figure, yielding a fluid secretion externally; but internally containing a more solid material, plastic, and destined to become a tissue. In the process of granulation, as it is conducted in the healthy state, the size of these bodies or granulations is restrained within certain, and, for the most, within narrow limits.

When, from some accidental cause, they exceed the ordinary volume, they sometimes present a very striking resemblance to a fungoid tubercle or granulation. At the same time, the smooth, continuous, defined, external surface calls to mind an observation which the production of false membranes upon the serous membranes, and in their cavity, has already given us the opportunity of making; namely, that it is the external part of the effused lymph, as well as of other coagulating fluids, which first becomes concrete, and forms a continuous membrane, shutting up the internal parts, whether they remain fluid, become organized, or break down. I had been forcibly struck with the resemblance which granulations, healthy in every respect except in their excessive exuberance, bear to fungoid productions; when an accidental circumstance arrested my attention, and appeared to throw some light on productions presenting the type of compound adventitious serous cysts. It happened that a fluid, perfectly transparent, and having a small quantity of mucus diffused through it, dropped into some spirit, of sufficient strength to precipitate or coagulate the mucus, and prevent its immediate admixture or diffusion through the spirit. As the drop descended towards the bottom of the vessel, its parts tended to spread and separate from each other; and as the mucus became opaque in its coagulation, the falling drop was distinctly visible in a branching form, bearing the closest resemblance to the ramifying bunches of pedunculated cysts so frequently found in the cysts constituting ovarian dropsy. The resemblance was too striking to be overlooked, and the rationale of the figure of the falling drop was sufficiently obvious: each of the several portions into which the drop was divided, after it entered the spirits, met of course with some resistance as it descended through the spirit: its slight degree of coagulation would favour this effect, and would produce the rounded dilated extremities of the branch, by which, in consequence of the same coagulability, it continued connected

Analogy
drawn from
the diffusion
of mucus in
spirit.

- with the other portions into which the original drop was divided. A similar appearance may be noticed, whenever two fluids are brought together, in such a way, that the one enters the other at a small point; whence it diffuses itself, retaining for a while its visibility, and the continuity of its particles, notwithstanding its diffusion. Thus we may see the appearance which I have described, on our plates at table, when, having added a little cream to fruit-tart, it makes its way, through the narrow straits which may allow it to pass between two pieces of fruit, into the transparent juice below.

In these two rough and accidental experiments, although the form produced is very striking, it is extremely evanescent, and is scarcely a moment in existence: but if the exterior of the fluid, which assumes the branching form, became a continuous coherent coagulum, as in the case of effused plastic lymph, a permanent bunch of cysts would have been formed. Let me not be misunderstood, as wishing it to be inferred, from what I have just said, that the bunches of cysts, entering into the composition of adventitious structures of animals, are thus instantaneously formed by the coagulation of the exterior of a quantity of coagulable lymph suddenly oozing through a small orifice. The process, though very similar, is doubtless gradual: the principle I believe to be nearly or quite the same. In a case of gummy or gelatinous cancer, which I have already described to you, some of the cysts, enclosing transparent ropy mucus, contained within this mucus another portion slightly opake, of but little more consistence, and presenting the form of a bunch of radiating pyriform bodies. From the nature of the materials here concerned, the appearance in question was but little more permanent than in the rough experiments which I have mentioned; but the case is very different with the ordinary compound serous cysts, as they are met with in ovarian dropsy, and in those tumors which affect a similar type. The form being once given, though

it be on a small microscopic scale, it will be more or less preserved when the nutrition of the new growth has given it a much larger size: this is not a gratuitous supposition, to anticipate an objection, or explain away a difficulty. In the first formation, if it take place as I have supposed, it is in strict conformity with what we may observe to take place in many other situations; and the coagulation of the external part, and its consequent formation into a membrane, may be safely admitted as an established principle. The formation of the membranes of the ovum in all probability depends upon it; and it is to these membranes that I shall now refer, in order to illustrate, not merely the possibility, but the probability, that when the type or form has once been given, it may still be preserved when nutrition has greatly expanded its dimensions.

Illustration
taken from
the mem-
branes of
the ovum.

I believe, that in admitting the probability of this mode of formation in the adventitious growths in question, I am not led merely by the plausibility of an imagined superficial resemblance. There are different circumstances, connected with these growths themselves, which give support to this belief. I have already observed, that when there are numerous growths of this kind upon a membrane, it is very evident that they are principally disposed along the course of the vessels: this is particularly striking with respect to the smaller vessels. It may however, at times, be seen, that the same tendency accompanies the larger vessels: and I was forcibly struck with it, in a case in which a growth of malignant character accompanied and nearly encased the aorta in the abdomen, and extended to some of the neighbouring trunks. In this case, which excited me to particularly minute examination, although the little bunches of pyriform bodies consisted of a light-coloured translucent substance with very little variation in colour, it was evident that these bodies radiated from different centres at or near the surface of the aorta or other vessels. The close proximity of a new growth to an arterial trunk, and its apparent intimate

Arguments
in support
of this view.

dependence upon this trunk, excited my surprise; since it seemed to indicate that it had directly been concerned in nutrition—a function which we are wont to consider, in most instances, as only indirectly connected with the trunks through the intervention of their branches, and more especially their minutest capillaries. It seemed, in the instance which I am now considering, that the nutrient fluid, from which the adventitious growth was derived, had actually escaped by oozing from the aorta itself; yet it is perhaps more likely that the vasa vasorum, and not the interior of the principal vessel itself, had permitted such oozing to take place. You will doubtless perceive that this view of the commencement of the adventitious structure excludes the question as to the priority of the cyst or its contents, as the formation of both is almost simultaneous, and their progressive increase proceeds *pari passu*.

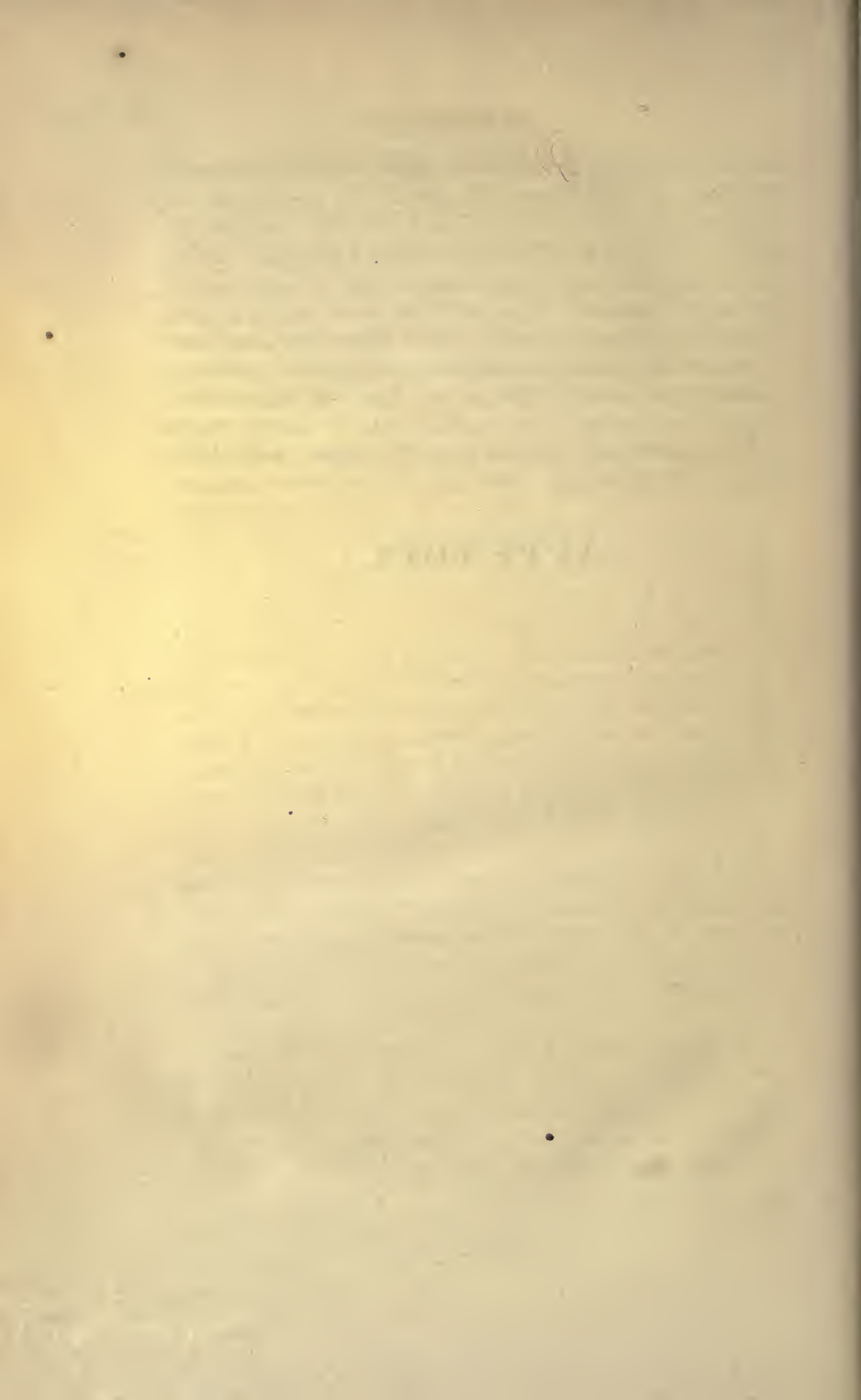
It seems to me to be quite consistent with the mode of formation which I here suppose, that the parts most disposed to furnish this formation are such as have had their texture injured; and, in conjunction with this, the mysterious power, which regulates formation and nutrition, either impaired, as in parts which have received local violence, or in which, through the influence of some natural causes, the function of nutrition is subjected to considerable variation, as the mamma and the ovary; or which, like *nævi*, always possess it in an inferior degree. I am the more disposed to admit the view which I have taken, from my not finding that it is contradicted by any fact or demonstrated principle: on the contrary, it seems mainly to depend on a principle established without any reference to it, and which admits of very extensive application; namely, the coagulation and consequent formation of a pellicle or membrane at the exterior or circumference of fluids susceptible of coagulation. The term ‘oozing,’ which I have employed in speaking of the escape of the nutrient fluid from the vessel, is, I admit, more questionable, and, in appearance, more

opposed to common opinions and the ordinary modes of speaking. Though I make use of it rather conjecturally, I wish to employ some term to make a marked distinction between that aggregate deposition of nutrient matter which leads to a new and adventitious growth, and the imperceptible, molecular, interstitial employment of the nutrient fluids in the universal and constant healthy function which is continually sustaining and renewing our tissues, and counteracting the losses which the wear and tear of life occasion.

Now, although it is pretty certain that some kind of transudation, such as has been described as endosmosis and exosmosis, takes place during life, yet it seems to be different from the transudation which takes place after death, and much less marked. It is to this transudation that the escape of small portions of nutrient fluid for the production of adventitious growths is somewhat allied. The circumstance, that local injury or spontaneous decline of vital energy in many instances may be proved to precede such formations, give further plausibility to the idea of this transudation or oozing. You will recollect, that I have already expressed some opinions connected with this subject, when treating of parts predisposed to favour the growth of adventitious tissues, which seemed to be the farthest removed from that influence, which, whatever be its nature, is sufficiently evident in its office of presiding over and maintaining our forms. It is possible that the co-operation of the nervous extremities may be defective, and that we see, in these growths, nutrition in one of its simplest forms, and dependent solely on what may be termed plasticity of the fluids. The production of these growths appears to be essentially distinct from inflammation, and ought not to be confounded with it: but where inflammation has subsided, and, its product being of the plastic character, organization is attempted, there is a certain similarity in the elongation of old vessels into the new material. There is

likewise a similarity in the two cases, as respects the success and permanency of this process depending on the nature of the substance into which the vessels are to be elongated. I see no reason to adopt the opinion of some pathologists, that they are arterial and venous vessels in the one instance, and arterial only in the other. Viewing, as I do, the adventitious structures, with which I have now so long occupied your attention, as examples of formation in its simplest character, I think that they are well worthy of attention, independently of their great importance with reference to disease: I therefore recommend them to your careful examination, whenever they may fall under your observation in a recent state.

APPENDIX.



NOTES AND CASES.

LECTURE I.

ALTHOUGH it is not my object to give the bibliography of Morbid Anatomy, I must not omit adding to the List of Works mentioned at page 22, that of Dr. Cragie, on General and Pathological Anatomy; and that of Otto, translated by J. F. South. The former contains a vast assemblage of laboriously-collected facts, which must render it a valuable treasure to those already acquainted with the subject. An extensive Index, or an improved arrangement, would, however, render a new edition more convenient, and more extensively useful. The work of Otto, though concise, and not yet completed, is also invaluable for reference. It is a rich repository of facts and authorities; and possesses the great and almost singular advantage of combining, with Human, much of Comparative Pathology. I cannot forego this opportunity of recommending British Students to pay increased attention to this branch; as the derangements of structures and organs in inferior animals are calculated to throw important light on those of man. The pathological parts of the writings of J. F. Meckel are of great value. As respects arrangement, I have derived greater assistance from that author than from any one else.

LECT. II.

IT does not appear to be necessary to append either Notes or Cases to the general observations on the Serous Membranes; since particular facts may, with more propriety, be connected with the consideration of these membranes individually.

LECT. III.

Page 69. See, in illustration of the Case of Arachnitis in which the product of inflammation was on the polished surface, the 9th Plate in the Second Volume of the Second Part of Dr. Bright's Reports of Medical Cases, and the Manuscript Record of the Inspection at the Museum.

Page 72. Adhesions between the two surfaces of the arachnoid, accompanying fungoid tumors.—See Preparations in the Museum; and Dr. Bright's Reports of Medical Cases, Part II. Vol. II. Plate 26: also the following Case, to which that plate refers.

ELIZABETH SMITH became a patient of Dr. Cholmeley, 9th of 12th month (December), 1828. She was night-nurse in Charity Ward, and was the mother of one or more grown-up children. For two years she had been subject to considerable pain of head, especially across the forehead. She had likewise been subject, during the same period, to fits, resembling epilepsy; in one of which, which occurred a very few days before her death, she fell on the fire, but was not burnt. From this fit, until her death, she had repeated fits of tremor and loss of speech, but continued sensible. The body was inspected 15th of 12th month (December).

HEAD.—On the anterior part of the right hemisphere, the two surfaces of the arachnoid were closely and firmly adherent to each other. There were at this part several small fungoid granulations, which appeared to have their seat immediately beneath the arachnoid, lining the dura mater; and might, for the most part, be separated from the surface of the brain without injuring it (pp. 72, 84): some, however, had contracted adhesions to it. These tumors were scarcely so large as peas; and were of a light colour, like the glandulæ Pacchioni, with a dash of pink. Over the rest of the brain the membranes appeared tolerably healthy. Some of the convolutions of the brain were rather flattened. There was rather a large quantity of serum under the arachnoid, and infiltrating the pia mater; and some very clear serum in the ventricles. The substance of the brain was generally loaded with dark blood; the medullary part presenting numerous venous points, and the cineritious part being generally of a livid colour: this was most remarkable in the cineritious portion of the corpora striata, but especially of the right: in these, the lividity was more intense and deeper in some parts than in others, producing a mottled appearance. The substance of the brain was generally flabby; but under the fungoid tumors, and more particularly those which had become adherent to the brain, the medullary

structure was extremely soft, appearing infiltrated with serum: it was unaccompanied by alteration of colour. The serum and medullary matter were not intermixed, so as to produce a cream-like substance. There were a few vesicles on the plexus choroides, which was of a purple colour.

CHEST.—The lungs and pleuræ offered nothing remarkable. The reflected pericardium was remarkably thin. The heart was healthy, but presented a white spot on both the anterior and posterior surfaces.

ABDOMEN.—The omentum was large, and attached by a strong old adhesion to the first part of the colon. In the pelvis there were two small, loose, rounded bodies, of about the size of peas: they had a light, smooth, semi-cartilaginous surface; but appeared to have a different structure, and a yellowish colour, internally (p. 160). The mucous membrane of the stomach was corrugated, and rather vascular, with a shade of grey: that of the intestines healthy. The liver was rather small; and had on its surface, immediately beneath its peritoneal coat, two small white tubercles of about the size of vetch-seeds: they were firm, and contained a small, smooth, easily detached nucleus, which in one was bony. The spleen was of moderate size, and accompanied by a small accessory one. Neither the kidneys nor the uterine apparatus offered any thing requiring notice.

Page 73. Puriform effusion beneath the arachnoid covering the pia mater.—See Dr. Bright's Reports of Medical Cases, Part II. Vol. II. Plate 1. fig. 1. Pl. 9. and Plate 10. fig. 1.

Leek-green colour of the puriform effusion.—See 8th Livraison of Cruveilhier, Plate 4. fig. 1.

The two following Cases will serve to illustrate the progress and appearances of the non-plastic or puriform inflammation of the arachnoid and pia mater. In both, the comparatively slight derangement of the intellectual faculties is remarkable. In both there was a slight appearance of the product of inflammation on the polished surface of the arachnoid lining the dura mater.

25th of 12th month (December), 1832. H—S—, aged 45, was of a feeble constitution, but of an active and energetic mind. From accidental causes, she had, for a period of a few weeks preceding her death, been subject to insomnolence. There had likewise been suspension and irregularity in the menstrual function. Eight days before her death, after having supped in apparent health, she was observed, during the night, or very early in the morning, and whilst yet asleep, to look so extremely ill, as immediately to raise the most serious apprehensions. She presently awoke, feeling

ill, with symptoms of a smart attack of fever. Medical assistance was immediately called, and an active aperient given. The tongue was of a bright red, with a tendency to be furred. The attack was obviously severe, with a pulse shewing very little power to meet it. During the first few days, a slight apparent improvement took place—the bowels acted with very little assistance. Some pain on the right hypochondrium was relieved by leeches. The temperature was but little elevated. With the exception of a little transient rambling at night, the intellectual faculties were undisturbed. About the fourth day, the head was shaved, and wetted with a cool lotion, to relieve heat and occasional pain. The symptoms became progressively worse, but were most distressing at night. The eyes were rather pale than otherwise. The head, though uneasy, was not very painful. The senses and intellectual faculties were clear until coma rather suddenly came on, about twenty-seven hours before her death.

HEAD.—The scalp exhibited a rather remarkable appearance, the hair over a considerable but well-defined portion being perfectly white: a spot of this kind had existed for years, but had considerably increased. The pericranium was rather dry: the dura mater was adherent to the inner table of the calvarium. There was a thin and pretty transparent lymph, interspersed with a few minute sanguineous spots, between the arachnoid lining the dura mater and that covering the pia mater, but more particularly attached to the former. The pia mater was almost universally infiltrated with a light yellow, concrete, puriform effusion, overlaying the upper and under surfaces of the brain; and extending, within the arachnoid, as far as could be traced, into the spinal canal. The pia mater was by no means unusually vascular; indeed it was rather in the opposite state. Although the large veins were turgid, the convolutions of the brain were very much compressed and flattened. Not even the cortical part of the substance of the brain exhibited any increased vascularity or alteration of colour. The ventricles were distended by a considerable quantity (about two ounces) of serum, slightly turbid, and containing a few floating particles. It might be compared to water in which a small quantity of bread-crumbs had been washed. The plexus choroides was very pale; the membrane lining the ventricles was slightly thickened, but rather soft; and some part of the substance of the brain, at the posterior part near to the ventricles, was a little softer than is natural.

CHEST.—At the inferior and lateral part of the right pleura, there were some pretty thick flakes of recently-effused lymph; and the corresponding portion of lung appeared to be inflamed. The left pleura and lung, and the heart, presented nothing remarkable.

ABDOMEN.—The peritoneum presented no appearance of inflammation; but there was a small filament of recently coagulated blood, which, together with the appearance of catamenial discharge, and, on one occasion, bleeding from the nose, which occurred during the last illness, and the minute points in the lymph on the arachnoid, may be considered as indicating something peculiar in the state of the blood or sanguiferous vessels generally. It may also be remarked, that all the tissues appeared to be rather soft than otherwise. There were old and pretty firm adhesions between the convex surface of the liver and the parietes. The substance of the liver appeared healthy. The spleen was rather soft. The pancreas and kidneys were healthy. The alimentary canal offered nothing remarkable. The uterus was rather large.

9th month (September), 1836. J—H—, aged about 50, stout, of sedentary occupation, and habitually of dull hearing. A few weeks before his death, he became increasingly deaf, his throat rather sore, and his fauces swollen and livid. The circulation seemed rather oppressed than excited, and the bowels were torpid: aperients were given, and leeches and a blister applied to the neck. Some relief was obtained; but the local means occasioned an unhealthy erysipelatous inflammation, which subsided. A few days before his death, he was suddenly seized with great tenderness, pain, and redness of one foot, especially about the great toe. This attack was attended with considerable fever, and had every appearance of gout, to which malady he had however never been subject. The affection of the foot being somewhat mitigated, was succeeded by more distressing pain in the hip of the same side. It was with difficulty endured, and caused much irritability. The febrile symptoms increased, but there was no incoherence of ideas, except a little at night, until about forty hours before death. In the morning of the day preceding that on which the patient died, he was decidedly delirious, and very imperfectly replied to questions put to him. The head was unusually hot. A very slight failure of muscular power was noticed on the same side on which the foot and hip had been inflamed. This diminution of power progressively increased to complete paralysis. The delirium in the mean time passed into permanent coma.

HEAD.—The dura mater adhered rather strongly to the calvarium. An extremely small quantity of a rather sanguinolent coagulated lymph was extensively diffused over the arachnoid lining the dura mater. The brain appeared as if covered with a close yellowish cap, in consequence of the thick and universal deposit of concrete puriform lymph beneath the arachnoid, and infiltrating the pia mater. These membranes, with the deposit just

mentioned, formed a firm layer, in some parts nearly as much as one-eighth of an inch in thickness, which dipped in between the convolutions, but was very readily separated from the surface of the brain. The thickness of the puriform lymph was the more considerable on the side opposite to that on which the paralysis had existed. There was much less appearance of inflammation on the inferior surface of the brain than beneath the calvaria. There was rather an increased quantity of clear serum in the ventricles. The external layer of the cortical substance was not particularly separable; and the substance of the brain, generally, though carefully examined, exhibited no conspicuous deviation from the healthy state. The only circumstance to account for the paralysis was the thicker layer of concrete puriform lymph already noticed as existing on one side.

The other parts were not examined.

Page 77. Bony deposit on the attached surface of the arachnoid covering the pia mater.—See Preparation 1585.

Bony deposit on the attached surface of the arachnoid lining the dura mater.—See several Preparations; and Dr. Bright's Reports of Medical Cases, Part II. Vol. II. Plate 31. fig. 2.

Page 80. Osseous bodies on the plexus choroides.—See Preparation.

Page 83. Blood effused beneath the arachnoid lining the dura mater.—See Preparations; Dr. Bright's Reports of Medical Cases, Part II. Vol. II. Plate 5; and Dr. Carswell's Fasc. VI. Plate 7. fig. 7.

Page 84. Fungoid tumors beneath the arachnoid lining the dura mater.—See many Preparations in the Museum; and Cruveilhier's 8th Liv. Plate I. fig. 1. Plate II. and Plate III.

Page 86. Puriform effusion within the spinal arachnoid.—See Cruveilhier's 6th Liv. Plate III. figs. 1 and 2. drawn from cases occurring in infants.

Page 87. Adhesions of the spinal arachnoid.—See Preparations in the Museum; and Dr. Bright's Reports of Medical Cases, Part II. Vol. II. Plate 21. fig. 6.

The following Case will illustrate the effects and appearances of chronic arachnitis.

A. B. a private patient of Dr. Stroud; inspected 12th month (December), 1830. He was about 42 years of age; of moderate stature; by occupation, a clerk in the Ordnance Department. He had suffered for nearly two years

from paralysis, often not complete. His arms were more affected than his legs. He had no precursory apoplectic symptom: his intellect was not affected, but he often complained of pain of back, more particularly between the shoulders. No cause could be assigned.

HEAD AND SPINAL CORD.—On raising the scalp, the occipital bone was seen to project, as if it had started from the lambdoidal suture; the inner table of this bone corresponding with the outer of the parietal. There was nothing remarkable on the exterior of the dura mater. The polished surface of the arachnoid was particularly free from moisture: there was no unusual quantity of serum beneath it, infiltrating the pia mater. The substance of the brain was healthy. The lateral ventricles were very large, and contained about $\frac{3}{4}$ of clear serum. The membrane lining them did not appear thickened, or materially altered. The foramen of Monro, without laceration or distension, was nearly a quarter of an inch in diameter. The plexus choroides, on both sides, was studded with numerous vascular cysts, some of which were about as large as currants. The septum lucidum was extremely thin: the commissura mollis appeared to have been separated. On raising the brain from the base of the skull, the arachnoid, covering the tractus opticus, pons Varolii, and medulla oblongata, and for some distance on each side of these parts, was found remarkably thick and opaque; to a great degree concealing these parts, and the nerves arising from them; and giving to the whole an unusual smoothness, firmness, and density. The same condition extended into the spinal canal, as far as it could be seen from the cranium. The cord, when exposed through its whole length by the removal of the spinous processes of the vertebræ, presented nothing morbid to the eye, but appeared large and plump. To the finger, however, it communicated neither the softness which is felt when the dura mater covering is distended with fluid, nor the flaccidity which is felt when the fluid has been evacuated: it felt full and firm. On laying open the dura-matral sheath, it was found unusually thick and firm; seeming to have a semi-cartilaginous structure, superadded to its fibrous, and probably dependent on a deposit beneath its arachnoid lining. This coat, throughout the whole length of the cord, had contracted strong adhesions to the pia mater: in some parts they were nearly general, but at intervals merely partial. Nothing morbid was observed in the structure of the cord itself, except some softening about the middle of the cervical portion. Some of the nerves seemed small, and compressed at their origins.

LECT. IV.

THE varieties and stages of Pericarditis are well exhibited in the Preparations in Guy's Museum arranged under this head. They do not require to be more particularly pointed out individually than has already been done in the Catalogue.

The Case related below will serve as an instance of pericarditis with non-plastic effusion ; and the length of its duration will shew that it is not the early stage of that form of inflammation which leads to the formation of cellular membrane.

A BOY, aged 11 years, residing in Turk Street, Spitalfields, a patient of Dr. Hodgkin, at the London Dispensary. Examined 6th of 3d month (March), 1827. He had been in an ill state of health for four years. It was stated, that his complaint commenced on his having the swine-pox : by which term was probably meant chicken-pox, or some modified form of small-pox, which last complaint he had had some time before. His affection consisted of difficult breathing, and uneasiness in the region of the heart, with considerable palpitation ; yet he was able to go to school, and to join in chanting, though incapable of uniting in the active exercises of his school-fellows. About eight or nine months before his death, he was a patient in the Dispensary, with the symptoms before mentioned : he was at that time considerably reduced in flesh. Under treatment, which in part consisted of the application of ointment of tartarized antimony to the region of the heart, he so far improved, as to leave the Dispensary, and return to school, from which he had been for some time detained. A few days before his death, he was again brought to the Dispensary. His countenance was pale and livid ; his strength and flesh were much reduced ; his breathing was more difficult, with cough and copious expectoration, and the palpitation continued. Some medicines were prescribed, and a blister was ordered to his chest. He died in the course of a very few days, without having again applied at the Dispensary. He had walked out not many days before his death ; and had not complained of much pain, except about the left hypochondrium. He had often complained of pain and difficulty in passing water.

HEAD.—The head was not examined.

CHEST.—There was some recent inflammation of the right pleura, which was partially adherent. The lung was more dense than natural, and contained some cavities and dilated bronchial tubes ; but was much less diseased than the left. The pleura on this side was very generally united by firm and old adhesions : on this side there had also been recent serous inflam-

mation. Imbedded in the substance of the lung, there was a long, thick, and soft fibrinous mass; which, on examination, appeared to have been formed between the lobes, in a space of small extent, in which the surfaces of the pleura had not adhered (p. 128). The structure of this lung, which was much reduced in size, was greatly condensed, and contained several cavities which appeared rather the result of common inflammation than of tubercles; and was traversed by several very much dilated bronchial tubes, which reached almost as low as the diaphragm. They were nearly capable of receiving the end of one's little finger. The parietes were firm and cartilaginous, and their lining membrane was almost of a chocolate colour. The pericardium was thickened, red, and unusually vascular; and contained a thick layer of soft, loose, light-yellow, opaque coagulum, not formed into a false membrane (p. 94). The heart was much enlarged. The aorta and its valves were healthy.

ABDOMEN.—The peritoneum exhibited the remains of recent and almost universal inflammation. A soft, light-yellow, opaque matter, having scarcely the consistence of a solid, was effused over the intestines, but especially between the convolutions which it feebly united. It had very much the appearance of pus in a concrete form (pp. 47, 150). There was little or no fluid in the cavity. The mucous membrane of the alimentary canal was pretty healthy. The liver was greatly enlarged; but its colour was tolerably natural, and its surface quite so. The change which it had undergone appeared to depend on enlargement of the acini; which, when cut through, exhibited an oblong figure, and appeared depressed in the middle. The fatty degeneration had commenced. The structure between the acini was unaltered. The spleen was of moderate size; and mottled by some defined portions of a lighter colour and firmer texture, not enclosed by a cyst. It appeared to depend on an alteration in the structure of the organ, and not on adventitious deposit. (See a Paper, by the Author, in the *Medico-Chirurgical Transactions*.) The kidneys were healthy. Nothing was discovered in the bladder to account for the pain on micturition, except that its mucous membrane was a little thickened.

The case of William Hobson, related in the first part of Dr. Bright's *Reports of Medical Cases*, is a well-marked example of the scabrous deposit on the surface of an inflamed pericardium.

LECT. V.

In the following Case we have an instance of the scabrous form of the product of inflammation upon the surface of the pleura. The quantity of serous effusion, which in such cases is generally considerable, had in this, probably, been absorbed. This Case likewise illustrates some remarks offered in the Sixth Lecture.

JOHN WELSH, aged 15, a patient of Dr. Cholmeley, in Luke Ward, admitted 11th of 7th month (July), 1827. He had been a sailor; and was, at the time of his admission, pale, thin, and of a consumptive appearance. He had been ill some time; having had, whilst at sea, a pulmonic attack, from which he never perfectly recovered: his skin was always rough and dry, and exhaled a very peculiar odour: he had some cough, almost absolutely without expectoration, and could lie on both sides. His chest exhibited a very singular conformation: at the upper part, a little to the left of the sternum, there was a slight depression, of about the size of the palm of one's hand. There was an obvious deficiency of bone and cartilage at this spot, which was thrown into tremulous and palpitating motion by the contractions of the heart. The patient stated this condition to have been congenital. He continued sinking, his complaint assuming more and more of a hectic character; but up to the time of his death he continued to have little or no expectoration. He had not been very recently examined with the stethoscope; but, some weeks before death, his chest afforded an imperfect sound, on percussion, though the respiration was generally audible. He died on the morning of the 24th, and was inspected about five hours after.

HEAD.—The head was not opened.

CHEST.—The third rib appeared to be wanting, from its angle anteriorly. The cartilage was also wanting, except a very small portion attached to the sternum. The space intervening between the second and fourth ribs was occupied by membrane; the intercostal and pectoral muscles being wanting. The pleuræ, on both sides, were much thickened by a firm adventitious membrane, which only partially united the opposed surfaces. The greater part of the surface had a scabrous and honey-comb appearance, similar to that which is occasionally met with in the pericardium: there was very little effusion, but some redness, indicative of recent inflammation superadded to the old. The lungs on both sides were loaded with crude milary tubercles, accompanied with some tuberculous infiltration near the base of the lung. There were no softened tubercles or cavities: the bronchial and some of the mediastinal and deep-seated axillary glands were converted into large, firm,

A similar case occurred to Dr. Stokes a few years ago. It is in my collection. P. B.

white, tuberculous masses, The heart and pericardium appeared to be healthy.

ABDOMEN.—There were extensive remains of peritoneal inflammation; which was of long standing, and had led to the deposition of considerable quantities of tuberculous matter. The upper and the anterior parts were chiefly affected: the viscera and the parietes in many places were glued together. The tubercles were not confined to the adventitious membrane, or to the secreting surface of the peritoneum. The thickened peritoneal coat of the liver was readily torn off; leaving on the gland the impression of numerous small tubercles, which roughened the attached side of the tunic. The peritoneal coat of the intestine, where not adherent, and where no adventitious membrane could be detected, was thickly sprinkled with small tubercles, resembling fragments of boiled rice. The omentum was thickened and contracted, assuming the form of a mass of tuberculous matter, of about two fingers' breadth. The mucous membrane of the small intestines was, in many places, of either a bright or deep red. The edges of the valvulæ conniventes were chiefly affected. The acini of the liver appeared to be enlarged. The organ was large, pale, and soft. The spleen was of moderate size, and accompanied by a small accessory one. The kidneys, and other organs, offered nothing remarkable.

The next Case affords a remarkable example of the tendency to form plates of adventitious bony matter on the attached surface of the pleura costalis.

JAMES TAYLOR, aged 56, examined 14th of 7th month (July), 1827. He had been a hard-working man; and for eight years had been employed in the King's-Head Yard, Borough. He was admitted into Lazarus' Ward, under the care of John Morgan, complaining of difficulty in passing his water, which was supposed to depend on the prostate. It was found, however, that little urine was secreted: and the case being regarded as medical, was transferred to Dr. Back. Two months previously he had taken cold, as he supposed, in consequence of sleeping with his window open. He had for some time been affected with pain and stitches on the left side, especially when carrying weights up stairs; and had also had palpitations, and a sensation of fluttering, as if a bird were in his chest. He had some dyspnoea; and did not lie down without inconvenience, especially on the left side, though he occasionally assumed that posture. He had, at times, disturbing dreams. About five weeks after his seizure, his right leg began to swell; then his right hand and arm; and afterwards his left leg and arm. His

abdomen became ascitic and tense, but the swelling of his upper extremities subsided. His pulse was reported to be irregular, and occasionally intermitting. This was, probably, not an invariable state; for it was not noticed when the heart was examined with the stethoscope; which was repeatedly done, in consequence of the *bruit de lime* observable in the contraction of the ventricles. He had some pain on respiration in the region of the heart; and tenderness of the abdomen on pressure, especially at the *scrobiculus cordis*. His urine continued scanty, or rather diminished in quantity, not exceeding a pint in forty-eight hours. He took Pulv. Scammon. \bar{c} Cal. Pilula Scillæ \bar{c} Hydrarg.; and other diuretics, as Juniper and Horse-radish. Examined 3d of 7th month (July). The right side of the chest was much more prominent and fuller than the left: resonance was almost or quite wanting, except at the upper part: respiration was very indistinct, but not wholly absent: there was, however, no *ægophony*, and no protrusion of the intercostal spaces. The ribs on both sides moved freely, during respiration. The left side was resonant, and the respiration was more audible. The impulse of the heart was very feeble: a little *bruit de lime* accompanied the contraction of the ventricles.—4th. Symptoms as before.—11th. The upper part of the right side has some resonance: respiration may also be feebly heard; but the sound seems to depend on the tubes, more than on the pulmonary tissue. Considerable bronchophony. Heart as before.

The body was still warm. The abdomen was greatly distended by fluid; a part of which (about ten pints) was withdrawn, for the sake of convenience, before the inspection was proceeded with. On this being done, the right side of the chest was observed to be rather more resonant than it had been a few days before death.

HEAD.—The head was not opened.

CHEST.—On opening the chest, the diaphragm was observed to be pushed up on the right side by the liver, as far as the fifth or sixth rib. The right lung was free from adhesions; and the pleura did not appear at all inflamed, though there was about a pint and a half of sanguinolent serum in the cavity. The two upper lobes, though rather loaded with blood, were quite crepitant; but the lower was compressed and flabby, and destitute of air; yet, from the appearance of its surface, it had not been long macerating in the effused fluid. On the left side, the pleuritic adhesions were nearly or quite universal: they seemed to be of long standing, but in some parts were much more easily separated than in others. In passing the hand on the inner side of the ribs, to separate the lungs from them, it came in contact with several rough and sharp projections of bone of various sizes. The largest was situated at the lower part of the chest, about midway between

the sternum and the spine. To this the lung was firmly attached, and was only separable from it by cutting: the others, to which the lung was much less adherent, were not far from the angles of the ribs. It was at first suspected that they depended on old fractures; but on the thorax being cleared, they proved to be projections from a large and strong layer of bony matter situated immediately behind the pleura, and separated from the ribs by a loose cellular structure, which admitted of considerable motion. It was broadest at the posterior part, becoming rapidly narrower towards the anterior part, and terminated in the large mass before mentioned. (Vide Preparation, 1776.) The left lung, as well as the right, was crepitant; and free from tubercles or other adventitious matter. The two surfaces of the pleura were pretty firmly connected by old adhesions; but the cellular structure, which they had formed, might be torn through without much force. The heart was large, firm, and blunt at its apex. There were a few small spots of bony matter on its surface. A large mass of the same kind in the parietes of the right auricle, but nearer to its inner than to its outer surface. There was a little thickening about the edges of the mitral valve. The cup-like cavities of the semilunar valves were nearly filled by osseous vegetations; and on looking into the vessel towards the heart, they appeared perfectly closed; yet it did not appear that the resistance to the passage of the blood from the heart had been very great, for the parietes of the vessel, yielding to receive the bony masses, allowed a pretty wide passage. The aorta was somewhat dilated, and, throughout its whole course, sprinkled with broad bony patches: there were also patches of extravasated blood, and of a darkish grumous matter, behind the lining membrane, which in some places was abraded: there were some clots of coagulated blood in the most diseased parts, but the greater part of the vessel was free from them. A tendency to ossification was evinced by a considerable increase of thickness in many of the arterial branches: this was particularly the case with the hepatic artery, even the smaller branches of which were so firm, that they might be torn away from the substance of the liver. The emulgent arteries were also much thickened.

ABDOMEN. — The mucous membrane of the stomach was a little discoloured, and rather soft, but thickened. That of the small intestines, both small and large, was pretty natural, but covered with a good deal of thick mucus, which, in some parts of the small intestines, was of a light greyish colour, like the membrane beneath it. The liver was not at all enlarged; and its structure, notwithstanding the state of the arteries, was pretty healthy. The spleen was small; and, with the exception of some adhesions about its tunic, and the more than usual redness of its substance, was

healthy, as were also the pancreas and kidneys. The ureters were not at all enlarged, nor did the bladder appear to be so: it may therefore be reasonably supposed that there was little the matter with the prostate, though this gland was, unfortunately, not examined.

LECT. VI.

THE remarks on the morbid appearances which are met with in the peritoneum might easily have been extended to a greater length than I have thought it necessary to give to them in the Lecture on that subject. Most, if not all of these appearances, may be referred to some of the principles which are laid down in the Second Lecture. The detail of a few characteristic cases may nevertheless be given by way of illustration, and to compensate for some deficiencies, by affording the opportunity of noticing minor peculiarities. The case of James Vaughan, in whom there was evidently recent peritoneal inflammation in conjunction with the remarkable condition of the alimentary canal, affords an instance of the muciform secretion of serous membranes which occurred both in the chest and abdomen. The lines of redness, and increased vascularity in the peritoneal surface of the intestines, when the convolutions were applied to each other, are worthy of observation. They are by no means uncommon in cases of recent acute peritonitis; and it is in the course of these lines that the product of inflammation, whether plastic or puriform, is often collected.—The peculiar condition of the mucous membrane of the intestines will require particular notice in the Second Volume, in which the affections of the mucous membranes are to be brought under consideration.

JAMES VAUGHAN, aged 30, a patient of Dr. Cholmeley, in Job Ward, admitted 31st of 1st month (January), 1827. He was a workman engaged in a lead-mill, in which kind of occupation he had been engaged but a short time. He had previously had good health. About ten days before his admission, after five days' constipation, he was seized with violent, obstinate pain of bowels. Leeches were applied; purgatives, combined with opiates, were given, and an evacuation from the bowels was obtained: after which he was for two or three days tormented with a very irritable state of bowels, passing as many as twenty-five dejections in the course of the day and night: they were mixed with blood and dark coagula. At the same time,

he had urgent retching, great pain and tenderness of the abdomen, and a quick pulse. The tongue moist, and very pale. He died on the morning of the 10th of the 2d month (February), and was inspected the same day.

HEAD.—The head was not opened.

CHEST.—The pleura was perfectly free from adhesions; but the secretion which lubricated it was remarkably viscid, exciting, when handled, the idea of mucilage (p. 30). The lungs were generally soft and crepitant, but a little œdematous. Near to the summit of the right, a portion, about the size of an egg, but imperfectly defined, was considerably firmer than the rest: when cut into, it was seen to be of a light colour, nearly devoid of air, but it contained a considerable quantity of thin, watery fluid.

The heart and pericardium were healthy.

ABDOMEN.—The peritoneum was covered with a secretion of a viscid and mucilaginous character (p. 30); exhibiting, at a few points, a slight tendency to the formation of adhesions. The secretion, like that of the pleura, was not in sufficient quantity to assume the form of a fluid. The peritoneum was, in many parts, of a pink colour, from the injection of minute vessels: this was particularly the case where the convolutions of intestine were in contact with each other. The mucous membrane of the stomach was pale, and, to all appearance, healthy: that of the duodenum, and a great part of the jejunum, also appeared healthy; but in the ileum, especially towards its termination, the mucous membrane was somewhat injected, and of a venous colour: it was extremely soft, being readily scraped off from the subjacent coat: this was particularly the case in the situation of the *glandulæ aggregatæ*, which were not at all thickened. The fecal matter in this part of the intestine adhered to these spots, and, on attempting to remove it, the mucous membrane separated with it. The edges of many of the *valvulæ conniventes* were in a similar state: they were tinged with yellow, from the adhesion of a very small quantity of fecal matter; and at the very edge there appeared to be some loss of substance in the mucous structure. In some parts of this intestine, the mucous secretion appeared to have been greatly deficient; and in these, the fecal matter was in the form of dry and compressed particles. The large intestine from the valve, nearly to the end of the sigmoid flexure, was much thickened and indurated, feeling like a semi-cartilaginous tissue between the blades of the enterotome. Its calibre was a little contracted: the rigid structure had acquired a permanent uneven surface—due, apparently, to the irregular action of the middle coat—similar in kind to that which produces the pouches of the colon. The internal surface presented a very unusual and mottled appearance. The prominent portions, which were tolerably smooth, were partly black, and

partly of an ochre yellow colour, from the dead mucous membrane, which still more or less adhered to them. The dead mucous membrane might be readily detached; and its loose and ragged edges were very apparent, when the intestines were immersed in water. The intervening portions of intestine appeared perfectly void of mucous membrane; and were of a greyish colour, and uneven surface. This diseased state was most marked at the commencement of the large intestine; and gradually passed off towards the last part of the sigmoid flexure of the colon, where the mucous membrane was merely rather grey and spotted. One of the mesenteric glands, near the jejunum, was rather enlarged, and of bony hardness. The liver was healthy; the spleen small and soft; the pancreas and kidneys were healthy. The bladder was distended with urine.

The abdomen, before it was opened, was tense, and perfectly flat; and on the muscles being divided, they so far retracted, that the cut edges could not be brought in contact by more than an inch.

The points of interest in the next Cases are sufficiently indicated by the references to the pages of the Lecture which bear upon them.

ELIZABETH SWINDON, aged about 40, a patient of Dr. Bright, in Dorcas Ward, examined 21st of 6th month (June), 1826. She had been affected for some months with ascites. She had been for a considerable time a patient in St. Thomas's Hospital, under Dr. Elliotson. She had been repeatedly bled, and had taken mercury to salivation. Her appearance was thin and pale, and there was œdema of the lower extremities. Her pulse was small, but quick and sharp. She had at times considerable tenderness of the abdomen. After her admission, she was again repeatedly bled by the lancet and by leeches. About four ounces, taken on one of the last days of her life, afforded a very small proportion of crassamentum, which was remarkably contracted and cupped. A few hours before death, she lay in an apparently comatose state. She had been once tapped about a week before her death. The left leg was considerably œdematous. The subcutaneous fat was almost totally absorbed.

HEAD.—On removing the brain for demonstration, the dura mater was found remarkably and strongly adherent to the cranium; especially in some points, in which the bone appeared to have been diseased, and to have suffered from absorption.

CHEST.—The lungs were crepitant, and free from adventitious deposit: there were some adhesions, about the base of the lungs, to the diaphragm and inferior parts of the sides of the thorax. There was nothing remarkable in the heart.

ABDOMEN.—The abdomen was much distended. Upwards of two gallons of remarkably colourless and clear serum were removed from the peritoneal cavity: it appeared to be quite free from flocculi of coagulated lymph. A thin adventitious membrane was spread over the peritoneum of the parietes; and there were some traces, though less distinct, about that of the intestines. The omentum was small, somewhat contracted or corrugated (p. 152). A cord-like adhesion connected it to the colon, in the right iliac region. It had a similar, but much shorter connection, on the left. The convex surface of the liver, and a part of the gall-bladder, stomach, and spleen, were connected by numerous, long, filamentous, and well-organized adhesions to the peritoneum, lining the diaphragm and upper part of the abdominal muscles (p. 156). The adventitious membrane covering the peritoneal coat of the liver was of rather an opaque white colour, and unequally thick; and had, from this cause, a honey-comb or worm-eaten appearance (p. 159). The liver was small, its surface uneven, its colour extremely pale yellow, and its texture much indurated, apparently from change in the interlobular cellular tissue. It had continued to secrete bile of a pretty natural character. The spleen was rather large and pale. The coats of the stomach and intestines were not particularly thickened, or otherwise altered. The mucous membrane was generally pale. The kidneys appeared healthy. The uterus was remarkably small: the os tincæ little prominent, and furnished with a very small opening. The ovaries were small, smooth, and flaccid; and so altered in structure, as scarcely to be recognisable. The left appeared merely to consist of one small cyst. In the right were two corpora lutea. The Fallopian tubes closely adhered to the surrounding parts (p. 157). The extremities towards the ovaries were dilated so as to resemble, in some degree, the petals of digitalis, and retained but little appearance of fimbriæ.

MARIA BOLTON, aged 40, a patient of Dr. Bright, in Dorcas Ward, inspected 2d of 12th month (December), 1829. She was a married woman, but did not appear to have ever been pregnant. She had previously been a patient in the hospital. She had at that time a tumid abdomen; in which, although there was peritoneal effusion, it was thought, even by the patient herself, that pregnancy was probably concerned. On this account she left the hospital, somewhat relieved; but was again obliged to apply for admission. All suspicion of pregnancy disappeared: the effusion into the abdomen was so great as to occasion painful distension. She was twice tapped. The fluid drawn off was nearly colourless, clear, and serous, but did not coagulate by the application of heat. She continued declining; and died, considerably emaciated.

HEAD.—The head was not examined.

CHEST.—The pleuræ were very free from effusion or adhesion; but the lungs were a good deal compressed by the elevation of the diaphragm. The pericardium was healthy. The heart was small, but its base was remarkably broad in proportion to the length of the ventricles. The parietes were of natural thickness, and the cavities not quite empty: the valves were healthy.

ABDOMEN.—The abdominal cavity contained upwards of a pailful of nearly clear, straw-coloured serum, in which were some flakes of tender lymph. The fluid shewed no disposition to coagulate, on its removal from the body. A thin, false membrane covered the intestines; and was in some places raised by serum, so as to resemble cuticle raised by a blister (pp. 52 & 140). There were some irregular, pellucid vesicles in the neighbourhood of the Falloppian tubes, which appeared to be of the same nature. There were numerous short, but stout and strong, old adhesions between the diaphragm and the convex surface of the liver (pp. 156 and 52) and spleen. Some of the spaces left between these adhesions were occupied by clear, thin, serous cysts, of an irregular figure, like those in the pelvis: they were of an elongated form, and were only attached at one extremity. When the contained serum escaped, they seemed to be merely a small, thin film of cellular membrane. The alimentary canal did not offer any thing remarkable. The mesentery was shortened (p. 152). The liver was firm and contracted, and of an irregular figure: its tunic was considerably thickened. When cut into, it exhibited a mottled appearance, of a lightish yellow colour. The acini were condensed into the form of rounded grains, easily detached; and the intervening cellular structure was firm, thickened, and semi-cartilaginous.

J. T. GRINDLEY, a patient of Dr. Back, in Job Ward, admitted the 22d of 1st month (January), 1828. Examined 2d of 5th month (May), 1828. He was affected with dropsy, and the effusion into the abdomen was considerable. He had at times suffered diffused pain of abdomen, but it did not appear to be very acute. He had been a man of intemperate habits; which, together with a defined induration in the epigastric region, favoured the idea of his having diseased and enlarged liver. There was a tumor under the jaw, on the right side, which was reported to have existed for some years.

HEAD.—The head was not examined. The enlarged gland under the jaw exhibited numerous small points of commencing suppuration or softening.

CHEST.—There were some traces of old pleuritic inflammation. There were tubercles in the right lung, and some appearance of recent inflammation. The heart offered nothing remarkable.

ABDOMEN.—On opening the abdomen, a large quantity of clear yellow serum was found in the peritoneal cavity. The intestines were concealed from view by a smooth false membrane, which closely invested them, kept them from falling into the pelvis, and formed a large, defined, and nearly spherical tumor (see a diagram by C. J. Canton), behind which one could pass one's hand almost to the vertebral column (p. 140). The fluid was wholly collected between this sac and the parietes; and there were likewise situated between them, more particularly in the pelvis, numerous thin and tender false membranes. The intestines, somewhat distended with gas, were glued together by adhesions; which, in some parts, were stronger than the connection between the peritoneal and muscular coats. The omentum was reduced to a slender, tough, leaden-coloured mass at the upper part of the tumor, and lying along the convexity of the colon. There was nothing particularly remarkable in the alimentary canal. The liver was not so concealed as the intestines; but it appeared somewhat contracted, under a thick and compact false membrane, which was nearly opaque, whitish, mottled with bright red, though not presenting distinct vessels, and, notwithstanding its density, was easily broken through. The liver itself was pretty natural in colour, but rather granular and firm. The spleen was soft, and, like the liver, covered with false membrane, which adhered much more firmly to the tunic of the organ than this latter did to the parenchymatous structure. The kidneys exhibited a slight degree of the mottling degeneration. There was some clear urine in the bladder; and on the application of heat, it became turbid.

MARY TARBUCK, aged 40, a patient of Dr. Cholmeley, in Martha Ward, admitted 12th of 11th month (November), 1826. She was thin, and much reduced by hardships, having laboured under a deficiency of the necessities of life. Her principal symptoms were, pain of the abdomen, diarrhœa, and urgent vomiting; besides which she had a good deal of cough, which disturbed her rest. A blister, and subsequently leeches, were applied to the abdomen. Starch glysters, small doses of castor-oil, and opiates, were given, without success, to remove the diarrhœa: and, with the hope of relieving the vomiting, which was of a very bilious character, soda-water and brandy were allowed. The body was examined 18th of 12th month (December).

HEAD.—The head was not opened.

CHEST.—There were some old pleuritic adhesions on the right side, at the summit of the upper lobe, and at the base of this lung. There were scarcely any traces of the kind on the left side. Both cavities were remarkably free from fluid. The substance of the lungs was free from adventitious deposit;

except at the uneven summits of the upper lobes, in the substance of which were lodged a few small, hard, rounded bodies, in which no trace of tuberculous matter was detected. The heart was small, and apparently healthy. There were one or two small white patches on the close pericardium, situated, as usual, on the part nearest to the sternum.

ABDOMEN.—Almost the whole surface of the peritoneum exhibited the marks of chronic inflammation. The omentum adhered partially to the parietes; more generally to the intestines; and was firmly attached to the lower part of the pelvis. The intestines were glued together; and a considerable part of the surface, both of the liver and spleen, were connected by adhesions to the adjacent parts. These adhesions were, for the most part, of a grey, leaden, or blackish colour; sufficiently tender to be torn through without much difficulty: but, wherever the product of inflammation was most abundant, there small, circumscribed abscesses were formed (p. 143); as, for example, between the omentum and the parietes, between the convolutions of the intestines themselves, and between them and the pelvis. The most considerable of these occurred where the portion of small intestines adhered to the side of the pelvis, to the right of the bladder: the peritoneum here appeared ulcerated through: the abscess, however, was, even there, circumscribed; and the pus shewed no disposition to burrow in the neighbouring cellular membrane. The coats of the intestines were nowhere ulcerated through, but they were generally so tender as to afford but little resistance to the finger passing through them. In some parts, the peritoneal coat, in others the mucous, tore readily from the muscular. Both of these states were most remarkable in the large intestines. The mucous membrane of the stomach was generally pale; but towards the cardia it was brown and softened: that of the first part of the duodenum was thickened, and uneven. In the remainder of the duodenum, jejunum, and part of the ileum, it was tinged with bile. It was somewhat softened in the remainder of the ileum; and the glandulæ aggregatæ were distinct, and of a leaden hue. The substance of the liver was pretty healthy, but contained a good deal of blood. The gall-bladder was filled with dilute, saffron-coloured bile. The spleen was small, and very lacerable: the kidneys small and pale. The substance of the uterus was considerably indurated: its exterior, and its appendages, considerably involved in the peritoneal adhesions before mentioned.

WILLIAM TRIMBEY, a patient of Dr. Back, in Naaman Ward, examined 12th of 7th month (July), 1826. No history of the case has been preserved.

HEAD.—The head was not opened.

CHEST.—There was some little adhesion of the right lung, at the upper part. No effusion into the cavity. The substance of the lung crepitant; but thickly sprinkled with miliary tubercles, of about the size of vetch seed, of rather a firm structure, and somewhat transparent: they appeared to be all similarly advanced. The adhesion of the pleura on the left side was universal, like that of the integuments to the parts they cover; but, excepting posteriorly, the adhesions were easily torn through. Nothing remarkable was discovered in the heart.

ABDOMEN.—There were various elongated and organized adhesions between the peritoneum covering the liver and the parietes of the abdomen (p.156); also between the spleen and the parietes. The liver was somewhat paler and firmer than in the healthy state. Imbedded in its substance, there was a small concretion, partly earthy, and partly of a semi-cartilaginous structure. On the surface of the organ corresponding to this deposit, the peritoneum was thickened, and puckered to a small extent. The spleen was large. A thin membrane connected the mesentery of two contiguous convolutions of intestines: at its border furthest from the spine, where it extended from one part of the intestine to the other, it formed a kind of cord; and at each extremity of the intestine itself there was a slightly yellow, opaque tumor, produced by a deposit beneath the false membrane. This deposit was of the consistence of thick cream; and might readily be made to pass along the cord-like edge of the above-mentioned membrane, which formed a complete duct, of the size of a crow-quill. (Preparation 2367; and pp. 52 & 143.) The stomach and intestines were more vascular than usual. This was particularly the case in the duodenum, in which the free edges of the valvulæ conniventes were of a bright red. The pancreas appeared healthy. The appearance which, before his removal from the ward, had given rise to the suspicion of hernia on the left side, was found to depend on a disease of the testis and cord. The epididymis was indurated, swollen, and of an irregular figure: that on the right side was similarly affected, but to a less extent. The vas deferens was swollen, at intervals, to the size of a horse-bean; and contained a soft, opaque, yellow substance, resembling tuberculous matter in the first stage of softening.

The case of Andrew Dennis was one in which the product of inflammation of the peritoneum was of the least plastic character. Its connection with stricture, and the almost total absence of abdominal pain, are worthy of attention.

ANDREW DENNIS, aged 40, a patient of J. Morgan, in Job Ward, admitted 23d of 7th month (July), 1826. He was admitted with stricture.

The stricture was extremely firm ; and considerable violence having been used in passing the catheter, there was every reason to believe that a false passage had been formed. On the 5th of 8th month (August), he became extremely ill ; his pulse very small and quick ; his countenance pale, and expressive of anxiety ; he had rigors and sickness. Peritoneal inflammation being suspected, leeches were applied to the abdomen ; but it was not deemed expedient to take blood from the arm. Though perfectly sensible, he made little complaint of pain ; and his position, approaching to the erect, did not seem to indicate much peritoneal tenderness. He died on the night of the 6th, and the body was inspected the following day.

HEAD.—The head was not opened.

CHEST.—The pleuræ were free from adhesion. The lungs were soft and crepitant. The air-cells were pretty generally dilated ; and there was a good deal of interlobular emphysema, producing the appearance of bladders on the surface of the lungs. The substance of the lungs was free from adventitious deposit, except black pulmonary matter and a small cretaceous tubercle in the left. There was nothing remarkable with respect to the heart, except a small white patch on its surface.

ABDOMEN.—The peritoneum, especially where covering the intestines, was minutely injected : its surface was everywhere bathed with a puriform fluid of a dirtyish-yellow colour, but there was not the slightest tendency to adhesion (p.150). The mucous membrane of the stomach was in some parts much softened, and readily separable, nearly in the form of mucus. It was mottled, in the form of reddish-brown, especially in the neighbourhood of the vessels. The mucous membrane of the duodenum presented large, irregular, bright and vascular spots ; and its surface was rendered uneven by numerous small yellowish bodies, apparently enlarged follicles. Except some increased vascularity in the ileum, the remainder of the intestinal membrane appeared to be healthy. The other coats of the intestines were not thickened. On the upper surface of the right lobe of the liver was an irregular light-coloured spot, of the size of the palm of one's hand, and formed by a thin layer of a firm texture immediately beneath the peritoneum, which firmly adhered to it, but which did not itself appear to be thickened. The substance of the liver contained a good deal of blood, but was in other respects healthy. The pancreas seemed quite healthy. The spleen was remarkably small ; and its texture, which was very soft, was of a light lilac internally, but dark, approaching to black, towards the surface. The kidneys contained much blood, with some appearance of ecchymosis. The ureters were of their natural size. The bladder contained some coagulated blood, but its lining membrane was not unhealthy. The stricture existed about two inches anteriorly to the

membranous portion of the urethra. At this part, the urethra, for the space of an inch and a half, was detached from the surrounding parts. The surface of the cavity which this separation produced was perfectly black, and the neighbouring tissues, to a slight depth, were of the same colour. A similar appearance was continued throughout a false passage, which commenced at this point, and passed by the side of the natural passage, and, for some distance, by the side of the bladder, almost between it and the rectum. There was some appearance of a second false passage having been commenced through the prostate, but it was of very little depth. The cellular membrane subjacent to the peritoneum, in the anterior part of the pelvis, was extremely lacerable; and a purulent fluid, slightly tinged with blood, was diffused through it.

The interest of the next case principally consists in there having been two distinct attacks of inflammation of the peritoneum: the first partial and circumscribed, which appears to have been excited by the ulcers in the lower part of the ileum: the second general, and much more recent, which may not improbably have been occasioned by the escape of a very small quantity of the unhealthy secretion contained in the circumscribed cavity.

EDWARD MIDDLETON, aged 22, admitted into Lazarus Ward, under Dr. Back, 6th of 10th month (October), 1830. He died of peritonitis, a short time after his admission. The body, which was still warm, was pale, and exhibited little appearance of emaciation.

HEAD.—The head was not examined.

CHEST.—The pleuræ were tolerably healthy, merely presenting a few old adhesions. The lungs were pretty healthy, free from adventitious deposits, but the bronchial tubes were loaded with mucus. The heart and pericardium were healthy.

ABDOMEN.—The abdomen, which was slightly distended, exhibited the most extensive effects of recent peritonitis, every part being covered by puriform serum and flakes of opaque yellow lymph: the latter, which was chiefly found where spaces intervened between contiguous convolutions and the other viscera and the parietes, slightly adhered to the highly vascular but apparently smooth and unbroken peritoneum, beneath which, in some parts, it presented numerous minute bloody points. The peritoneal covering of the stomach was pale; and the products of inflammation on this organ seemed rather to have been conveyed to it, than formed upon it (p.158). The folds of the mesentery were feebly glued together. The convolutions of intestine did not completely fall into the lower part of the pelvis;

and between them and the sides of the pelvis, and quite the lower part of the abdominal muscles, there was a very feebly circumscribed cavity, containing a discoloured turbid serum of an offensive odour. The lymph which covered the portions of convolutions of intestine which concurred to form this cavity appeared to be, in part, a deposition from this fluid. It was by no means thin; and presented a few irregular fissures, forming a complete contrast with the lymph in other parts of the abdominal cavity. The mucous membrane of the stomach, which contained a good deal of dingy green, bilious fluid, was, to all appearance, healthy, exhibiting merely a very faint pink or flesh-coloured blush. The mucous membrane of the intestines was generally healthy; except the last eight or ten inches of the ileum; which was the seat of numerous deep ulcers, that, in one instance, seemed to have completed a small perforation: but as the intestine at this part was opposed to another convolution, to which it was feebly united by recent adhesion, it is not probable that any fecal matter had escaped. In some other points, the ulcerations had only left the peritoneal coat, which appeared to be in a state approaching to gangrene. The appendix cæci was rather swollen, but not concerned in the formation of the circumscribed cavity. The other viscera offered nothing particular to require notice.

The next case is one of loose defined rounded body in the peritoneal cavity. The remark respecting the state of the mucous membrane in the case of J. Vaughan is applicable to this case also.

JOHN STEDMAN, aged 33, an athletic man. He was admitted 24th of 11th month (November), 1828, into Lazarus Ward, under Dr. Cholmeley. He had been a plumber. When a young man, he went to Canada, where he followed his business for two years: he then, about eight years before his death, travelled through a considerable part of the continent of America, and had the yellow fever. Three years after, when at work as a plumber in London, he became very eccentric; would walk all night in the country, though he had a home; and in one of his more violent fits, he wounded himself considerably. He was otherwise regular in his habits. "Spirits made him mad."

Appl. Empl. Lyttæ pectori.

Pil. Scillæ c̄ Hydr. Digit. et Extr. Papav.

From auscultation on the 26th, it was remarked, that, anteriorly, the sonorous rattle was general: posteriorly, some crepitating rattle, most likely from pulmonary œdema or apoplexy.

27th. Great depression, anxiety, and paleness: abdomen painful, and

very tender. Pulse 104, contracted, and rather hard : respiration 44, difficult and painful : cough short and frequent : mind collected.

29th. Pulse 106, hardish and small : respiration 44, laborious, and more gurgling, both in the lung and trachea. Has slept ill. Bowels very frequently open in bed. Pain still continues.

During the 30th he continued much the same, his bowels being open every ten or fifteen minutes, and the stools fetid. He died on the following day, at 4 A.M.

SECTIO CADAVERIS, nine hours after death. The body appeared generally anasarcaous.

HEAD.—The glandulæ Pacchioni externæ were unusually large. There was rather more serum than is usual between the membranes. The blood-vessels of the pia mater were not very turgid ; but the blood which they contained was florid, almost like that of an artery. The right corpus rhomboideum, instead of its ordinary grey colour, was of an ochre yellow, and of a soft consistence, easily broken down.

CHEST.—The cellular membrane was watery. On the right side of the chest there was a small quantity of recent effusion, and partial old adhesions of the pleura. Where these adhesions did not exist, the pleura pulmonalis was easily torn from the lung. The substance of the lung was rather cedematous : it was generally pervaded with air, and crepitant. There was a slight general appearance of emphysema ; but as none of the air-cells were much dilated, this appearance probably depended on the state of the bronchial tubes, which were obstructed with viscid mucus, and bore marks of inflammation of the mucous membrane. The back part of the lung was pretty thickly sprinkled with small, dull red spots, in which extravasation appeared to have taken place. On the left side of the chest there was very little more effusion. The pleura was very nearly, if not absolutely, free from adhesions. The lung and bronchial tubes were in the same state as on the right side ; but the red spots were not so conspicuous. The heart was not hypertrophied : about a quarter of a pint of serum was found in the pericardial cavity. There was a slight and partial opacity of one of the curtains of the mitral valve. The blood in the heart was generally fluid ; but in the left ventricle there was a coagulum, the greater part of which was of remarkably white colour, and appeared to be nearly pure fibrine.

ABDOMEN.—There were several pints of serum in the abdomen, and a few recent flocculi of adventitious membrane at its upper part. A hard nut-like tubercle, consisting internally of a fine yellowish, slightly earthy substance in a thin bony shell with a very thin, semi-cartilaginous covering, was found perfectly unattached in the greater omentum, which was thin, and

its layers distinct (p. 161). The omentum presented one small indurated spot, black internally, and which appeared to be a cicatrix. The stomach was pretty healthy. Under the mucous membrane of the jejunum, especially under its valvulæ conniventes, was an effusion of dark blood. The arch, and part of the sigmoid flexure of the colon, were remarkably sacculated, from the strong contraction of its muscular fibres. It had a mottled dark colour externally; which depended on the state of its internal surface, which was of a very dark or nearly black colour, with a tinge of olive. It was extremely irregular, corresponding in some degree to the irregular contractions observed externally. Those parts which projected internally were smooth and rounded; but a thin, dark, dead membrane was easily separated from them: the cellular structure had a dirty yellow tinge. In the depressions, the mucous membrane appeared to have been already, for some time, partially removed by ulceration. The peritoneum covering the liver was rather striated: the liver itself was large and engorged: its substance healthy. The spleen was also gorged. The kidneys were large: their substance pale and soft; and their surfaces covered by minutely injected, meandering vessels. These organs, though somewhat mottled, were much less so than is generally the case with the white deposit which accompanies coagulable urine. This white deposit was rather diffused.

The bursæ formed on the patella are not merely liable to become the seat of inflammation, by which false membranes, adhesions, bridles, and various irregular growths are produced on the polished or internal surface (see p. 179): but the product of inflammation on the attached surface, in some instances, produces a semi-cartilaginous structure, of nearly a third of an inch in thickness (see Preparations 1375, 1375^A, and 1375^B). Such cases, which are the result of chronic inflammation, are analogous to the great thickening of the reflected portion of the tunica vaginalis, in some cases of old hydrocele. (See p. 176, and Preparation 2381^A). The probable cause is the same in both situations, viz. the constant renewal of irritation from external influence.

LECT. VII.

IN Cruveilhier's 19th Livraison, Plate II. fig. 1. 3. 4. 5. 6. 7. are delineated examples of acephalocysts possessing the modification of form described at p. 190 as dependent on the outer layer of the hydatid. Since this Lecture was printed, I have witnessed the inspection of an extraordinary case of this species of hydatid, which had been of several years' duration, and had occasioned great distension, and invaded every part of the abdomen. In this case, several of the junior hydatids had assumed a very remarkable and irregular figure, in consequence of mutual compression.

The following cases appear to be instances of abscess occasioned by the existence of an old and condensed hydatid cyst after the death and contraction of the proper hydatid membranes. It is probably a much less rare occurrence for acephalocysts to give rise to abscess at an earlier stage, when the membranes have but recently lost their vitality, especially if the tumors have been punctured, and the hydatids have been only imperfectly withdrawn.

WILLIAM AYLWART, aged 34, a patient of Dr. Bright, in Luke Ward, admitted 7th of 4th month (April), 1830; examined 19th of 5th month (May), 1830. He was affected with some degree of jaundice, and pain of side. The jaundice, to a great degree, subsided, but his countenance continued pale and yellowish. A flattened tumor, somewhat larger than an orange, appeared at the scrobiculus cordis. It made its way towards the surface, and was soft and fluctuating in the centre, around which was a somewhat indurated margin. He had been cupped at this part; and it seemed probable that the scarifications would favour the formation of an external opening, and render the use of the lancet needless. The patient, however, complained of so much oppression, that it was thought expedient to make an opening. It was opened; and a thin and excessively offensive matter escaped, having the characteristic odour of gangrene. Very little relief followed, and the patient shortly afterwards expired.

The parietes of the abdomen were firmly adherent to the surface of the liver, for some distance around the orifice. The adhesions were old and firm, almost semi-cartilaginous. The liver was remarkably large, principally from the unusual size of the left lobe: the surface was smooth; and the structure throughout was very characteristic of hypertrophy of the acini, without sensible alteration of the intervening cellular membrane: the colour was little altered, but perhaps rather darker than is quite natural, from congestion. The sternum having been raised, a vertical

section was made, both upwards and downwards, from the opening in the abscess. This exposed a cavity in the liver, capable of holding a moderate-sized orange: it was irregular: the substance of the liver at the part was broken down, dark-coloured, and highly offensive: the cellular membrane of the parietes, where not indurated, was sphacelating. The upper part of the incision laid open the pericardium, which was immediately opposed to the abscess, the diaphragm alone intervening. The pericardium was distended with turbid, puriform fluid, mixed with opaque flakes of ragged lymph (p. 93). The surface of the heart was covered with a thin and somewhat scabrous, false membrane (p. 96): it was beneath the flakes of lymph, and was pretty firmly adherent to the close pericardium. The reflected portion exhibited considerably increased vascularity, but was only partially covered with false membrane. Adhesions between the parietes of the abdomen and the convex surface of the liver, and portions of a dense semi-cartilaginous structure, of a whitish colour, to the right of the before-mentioned tumor, seemed to indicate further derangement in the substance of the liver: and, on cutting into it at that part, two cavities were discovered; the smaller and anterior one of the size of a walnut, containing puriform mucus; the larger, the size of an orange, containing a more dirty and offensive, but thickish fluid. The diaphragm adhered to the base of the lung, by means of a short but loose cellular membrane, in which numerous straight and parallel vessels were seen passing from one surface to the other, between the lung and diaphragm. The parietes of these cavities were dense, semi-cartilaginous, of whitish colour, and somewhat transparent: the internal surface was granular. In the larger cavity, there was a ragged fragment, of a dense, irregular membrane: it was tough and ligamentous, with a slight intermixture of bony matter; and was of a whitish colour, mottled with spots or patches stained with bile. It had nothing of the character of an hydatid membrane; and it seems difficult to account for so complete a detachment.

There was no other appearance in the contents of either of these cavities which seemed like the débris of hydatids, yet it is not easy to assign any other origin to them (p. 196). In the lower part of the abdomen, between the folds of the mesocolon, near the right iliac region, there was an irregularly-rounded tumor, about as large as a moderate-sized orange: it was of a nearly white colour, and cartilaginous structure. On cutting into it, it was found to contain several hydatids, of the genus *acephalocystis*; some of which were still distended, and apparently living; others folded together, and appearing to have died a considerable time before the death of the subject. They were a little discoloured, but retained a good deal of transpa-

rency. On the internal surface of two of the larger living hydatids were large, irregular, cauliflower-shaped elevations; one on each: they were firmly adherent, and were of an opakish, white colour. There did not appear to be any other morbid or preternatural appearance; except that in the pelvis there was a little clear serum, and some tender films of transparent lymph.

ANTONIO MASSHYE, a patient of Dr. Bright, in Lazarus Ward, examined 9th of 8th month (August), 1831. He was a Portuguese, who, it appeared, had served in our army or navy. He had been ailing for some time before his admission, and laboured under disease of the chest. His countenance was rather sallow and icteritious. His abdomen was rather distended; and the epigastric veins were so remarkably enlarged, as to induce, in Dr. Bright's mind, the suspicion that there was some cause of obstruction in the cava.

This appearance of the veins had disappeared in the dead subject; and the only remarkable external appearances were the numerous and gay marks which he had indelibly fixed in the skin of the arms &c. Some of them were such as to evince at once his superstition and sensuality.

HEAD.—The head was not examined.

CHEST.—The right side of the chest exhibited the effects of pleurisy. From the thickness of the product of inflammation, which was equal to that of a half-crown piece, and from its nearly semi-cartilaginous firmness where in contact with the subjacent parts, the pleuritis must have been of long standing (p. 104); but the character of recent inflammation was still present on the surface of the false membrane, in contact with the fluid effusion (pp. 48 and 50.) This surface was soft, tender, and semi-transparent; and reddened by interspersed red spots, which appeared to be produced by ecchymosis, rather than (see Drawing) by the presence of already-formed vessels.

ABDOMEN.—The iliac veins and lower part of the aorta were not obliterated. A cyst existed at the posterior part of the liver; so situated as to press upon the cava, which was obliterated at that part. This cyst was filled with a dark-brown, ochreous mass, mixed with ragged shreds of a tough, fibrous membrane and irregular plates of bone, which appeared to have been produced by the partial ossification of the fibrous membrane. Some of the shreds and bony plates were adherent to the parietes of the cavity containing them, whilst others were detached. (See Preparations.) Little or no doubt existed that these appearances were produced by an old hydatid sac (p. 196).

LECT. VIII.

THE following case of encysted dropsy appears to have been occasioned by the formation of a large simple serous cyst in the folds of one of the broad ligaments, or in one of the ovaries. It is remarkable for the twisting together of the cervix uteri and round ligaments, occasioned, in all probability, by a kind of spontaneous revolution of the cyst. It appears that a considerable degree of inflammation had long existed in the interior of the cyst.

JANE HUDSON, aged 26, admitted into Charity Ward on the 17th of 1st month (January), 1828. A patient of C. A. Key. Five years ago, being one month after her confinement, she discovered a tumor situated on the right side. It was supposed to be occasioned by a collection of fæces; and purgatives were given without producing any effect on the tumor. Soon after the appearance of the tumor, her urine became scanty. Her health improved; and continued good till eight months after the birth of her second child, at which time it died: she was suckling it at the time. The tumor now began to increase, and she suffered much from hysteria. The menses were profuse. This state of things continued till about eight months ago, when again she became pregnant, but miscarried about the third month. When admitted into the hospital, the tumor was so large as to impede her walking about. Her health was much impaired, and she had frequent hysterical fits. She was tapped on the 4th of 2d month (February), but part only of the fluid (four quarts) was drawn off. She was carried off by peritonitis.

HEAD.—The head was not examined.

CHEST.—The lungs and pleura, and the heart and pericardium, were remarkably healthy.

ABDOMEN.—In the abdomen, there were extensive marks of peritonitis. The adhesions, which extended over the whole of the anterior and lateral parts of the cavity, were thin and membranous, and of a dark slate colour; but where the effused substance was most abundant, there was a tendency to the formation of small collections of pus. All the fluid part of the effusion from the surface of the peritoneum appeared to have been absorbed. The thin, but dirty and opaque fluid which was found in its cavity was evidently derived from the large cyst which formed the tumor which had been observed during life; and its escape, which was obviously recent, probably took place, either in removing the body, or in the first attempts to raise the parietes which were adherent; either of which might have separated the slight adhesions which covered the small ulcerated openings which

perforated the cysts from its internal surface. The omentum, which was thin, and spread over the whole of the anterior part of the abdomen, was slightly adherent both to the parietes and to the viscera: it was of the same slate-colour as the newly-formed adhesions. The peritoneum lining the parietes was thin, and easily detached from the aponeurosis of the muscles.

In the anterior and inferior part of the parietes there was an abscess, which extended, behind the symphysis pubis, into the cellular membrane of the pelvis. It was however circumscribed; and though tolerably extensive, it was not diffused through this structure. Its internal parietes were of a dark colour, and its contents dirty, with a trace of yellowish brown colour, and very offensive odour; yet it did not appear to contain fæces, or to communicate with the intestine. The uterus, which was rather large, was pushed obliquely over to the right side: it was considerably distorted. The os tinæ was cleft, and the cervix and round ligaments were twisted together (Preparation 2237^c); and the position of the ovaries and Fallopian tubes, which had contracted adhesions, was so altered, that it was difficult to recognise the spot at which the tumor had commenced. The cyst was unaccompanied by any attempt at the production of others. It contained a thin dirty fluid, mixed with ragged flakes of yellow coagula: it was rendered irregular, internally, by ulceration, and had a few small perforations. The alimentary canal appeared tolerably healthy, except a little dentritic injection in the duodenum. The liver was large; but towards the scrobiculus cordis it had been compressed by the tumor, which, on the right side, extended almost to the crista of the ileum.

For a plate illustrative of the forms of Compound Serous Cysts, see the Fifteenth Volume of the Medico-Chirurgical Transactions.

With respect to these adventitious structures being supplied with arteries or veins, or both, I may observe, that a careful injection with coloured size has convinced me that they possess, as might be conceived *à priori*, both sets of vessels; which, for the most part at least, ramify in exact correspondence with, and close approximation to, each other. As to the existence or absence of lymphatic vessels, I have no observations to offer.

LECT. IX.

THE reader is referred to the Fifteenth Volume of the Medico-Chirurgical Transactions, for plates which may facilitate the comprehension of the views offered in this Lecture. Some of them are well illustrated in Plates I. II. III. of Sir Astley Cooper's Work on Diseases of the Breast; although the malignant character of the tumors there delineated may be regarded as doubtful. See also some remarks on tumors possessing the structural characters under consideration, in a Letter addressed to J. Hilton, in No. III. of the Guy's Hospital Reports, p. 495.

LECT. X.

For a representation of the small cysts occasionally seen in the adipose membrane in the neighbourhood of a scirrhus tumor, see Sir Astley Cooper's Work on the Breast, Plate 5. fig. 1. Also a plate in the Medico-Chirurgical Transactions.

In the Second Number of the Guy's Hospital Reports, the reader may find some good delineations of sections of uteri containing tubercles in different stages. They are appended to a paper by my friend Dr. Ashwell, on the complication of pregnancy with the existence of such tumors. In the same Number there are also some observations on the structure and progress of these tubera, which the Doctor has done me the favour of inserting in his paper. I refer to them, as containing particulars not noticed in the preceding Lectures; since they rather belong to a Lecture on the uterus especially, than to the general Lectures on the class of adventitious structures in which these tubera are included. I also feel called upon here to offer a few observations respecting some strictures on that paper, in the recent work of J. T. Ingleby. I have certainly no wish to depreciate the work, which I have not read, but of which I have received a favourable impression; and I would willingly confine my notice of the author's strictures to a private communication with him, if such a course would not seem like a tacit admission of their accuracy, and leave the public misinformed. With respect to the anatomical character or structure of these formations, it is a matter which admits of ocular demonstration: and as I find that very numerous observations uniformly confirm the description which I have given, to the

satisfaction of others as well as of myself, I can only suppose that the points in question escaped the notice of the author ; which may easily happen to one who is not accustomed to examine these growths in different tissues. As to the malignity of these formations, conflicting opinions will probably be drawn from the very same cases. I have fully admitted the general indolence of these uterine tumors, and assigned a probable reason for it ; which receives some confirmation from the very exceptions, in which they undergo precisely the same mode of softening and decay which is common to other growths of this class. Their very frequent connection with unquestionably malignant affections in other parts of the body must, I conceive, be generally known and admitted, and, in conjunction with the strict resemblance in structural character, affords, I conceive, a sufficient reason for placing them in the same family. The author states, that these tubercles are sometimes " nearly identified with the proper tissue of the organ," and are apparently destitute of an encysted structure. I do not deny his accuracy in this respect ; although I have never found any thing of the kind, in a very large number of specimens which I have seen and examined. I hope he has preserved the specimens to which he has referred ; since I am persuaded that they will prove either to be cases of extreme interest and rarity, or shew that there has been some fallacy in the mode of examination. The author seems also to doubt that the development of these tumors is accompanied with an increase in the size of the uterus itself, but rather considers that it undergoes absorption. I shall be glad to have an opportunity of shewing him several specimens in which this increase has taken place, almost to the same extent as in pregnancy. I know that this increase is not invariably the case ; and that, on the contrary, the substance of the uterus may be much less than is natural : but I do not pretend to decide whether the tubercle was developed in a very small uterus, or whether the uterus was reduced after the formation of the tubercle.

Page 289. See a plate in the *Medico-Chirurgical Transactions* illustrating fungoid disease affecting bone.

Page 291. See a plate representing the gelatinous or gum cancer affecting the pyloric portion of the stomach, in Dr. Carswell's 3d Fascic. Plate I. fig. 8. There are in the Museum several excellent specimens of this structure, situated in various parts of the body.

LECT. XI.

SEE, in the Second Part of Dr. Bright's Reports of Medical Cases, Vol. II. Plate XXIV. fig. 3. a representation of the arachnoid lining the dura mater rendered grey by a multitude of minute particles of black matter.

Page 303. See, in the Edinburgh Medical and Surgical Journal, the interesting papers of the late Dr. J. C. Gregory, and of Dr. W. Thomson, on the black colour of the lungs, caused by the inhalation of coal-dust.

The following case appears to be an example of blackening of the lung, in conjunction with alteration of structure resulting from pneumonia.

JOHN MILLER, aged 50, admitted into the Clinical Ward on the 21st of 4th month (April), 1830. He was a stout man; and had for some time been the subject of shortness of breath, and winter cough. He had latterly employed himself in selling hearth-stones. At the time of his admission he was labouring under great difficulty of breathing: his countenance was livid; he had considerable cough, but the expectoration, which had been copious, was greatly diminished. The man's own expression was, "that he had spit up all that he had to spit." His abdomen was swollen with ascites, and his legs with œdema. His urine coagulated on the application of heat. He had a puffy, fluctuating swelling on the left arm: it was the consequence of a blow, but was attended with little or no pain. (See the Clinical Ward Books, 1829-30.) The body was examined on the 29th of 4th month (April), 1830: the face was bloated and livid.

HEAD.—The head was not opened.

CHEST.—Both pleuræ contained serous effusion, but the right by much the larger quantity: the adhesions were old and partial. The surface of both lungs, but especially of the right, was rendered remarkably uneven and irregular, by puckered depressions, and rounded protuberances; with some short bridges of adventitious membrane, stretched across some of the depressions. There was likewise partial thickening of the pleura pulmonalis, giving it whiteness and opacity. The principal depression was about the middle of the lung, laterally. The rounded prominences evidently depended on emphysema, from dilatation of the air-cells; and the depressions were produced by great but partial contraction, with consolidation and induration. The substance of the lung was of a leaden hue; and the puckered indurated portions, when cut into, not merely presented a dark blueish, slate colour, but in some parts broke down under the finger, producing a substance like powdered slate and water. (See Preparation 1729^a.) It had

but little odour, or, at the least, nothing like that of gangrene of the lung; nevertheless, it left a pretty permanent, dark stain, especially on the finger-nails, as is sometimes the case with gangrenous lungs. This state of the lung was probably the result of pneumonia with hepatization, not of the least plastic kind, which had permanently obliterated the air-cells of the affected part. This state occurred on both sides of the chest. The mucous membrane of the trachea and bronchial tubes was of a deep-red colour, thickened and granular. The heart was prodigiously enlarged, particularly the right ventricle, which was thickened as well as dilated.

ABDOMEN.—The abdomen contained a large quantity of serum (perhaps several gallons): it was clear and straw-coloured, and free from flakes of coagulated lymph or false membrane. The omentum was not corrugated; but beautifully extended over the viscera, containing very little fat, and having its layers remarkably distinct, for the age of the person. The mucous membrane of the stomach was rather injected; that of the small intestines tolerably healthy: that of the colon presented the traces of old ulcerations, in the form of narrow and, for the most part, unbroken lines, of a leaden hue, very slightly depressed, having irregular edges, and being little moveable on the subjacent coat: these lines corresponded to the bands of the colon. The intervening mucous membrane was tolerably healthy. The liver presented somewhat of the mottled character, produced by a light colour of the indurated acini, and a deep venous injection of the intervening substance, which concurs not unfrequently with enlarged hearts. The spleen was of moderate size, but turgid, and of dark colour. The kidneys were far advanced in the mottling degeneration.

For some account of the peculiar affections of the absorbent glands, alluded to at p. 322, see a paper by the author, in the 17th Volume of the *Medico-Chirurgical Transactions*.

LECT. XII.

IN the review which, in this Lecture, I have given of the opinions of different authors who have treated of cancerous affections, I regret that those of Schröder van der Kolk have not been mentioned. Although that author's work has now been published for several years, it has been little accessible, and little known. From a short notice in the work of my friend Professor Alison, I was desirous of seeing the observations of Schröder van

der Kolk, and endeavoured to obtain the work containing them; but having failed in that attempt, I did not become acquainted with the views of the Dutch pathologist until the last sheet of these Notes was in the press; when my attention was called to the elaborate analysis of them, which has been given by Dr. Craigie in the cxxviiith Number of the Edinburgh Medical and Surgical Journal. To that article I must refer the reader; and limit myself to remarking, that although Schröder van der Kolk has not occupied the same ground which I have taken, some of our views and observations appear to be in accordance. As respects his distinctions, and the grounds on which they rest, I feel under the necessity of differing from him; as I must also do with regard to some of his opinions on the formation of new vessels. On the subject of tubercular phthisis which I have prepared for the Second Volume, I observe a striking similarity between some of the opinions of Schröder van der Kolk and those which I have been in the habit of teaching for years past.

END OF VOL. I.





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